GAS JOURNAL

LIGHT • HEAT • POWER • BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

Vol. CXLVIII. No. 2949.] LONDON, NOV. 18, 1919. [71st Year. Price 8d.

OXIDE OF IRON
SPENT OXIDE

GAS PURIFICATION AND CHEMICAL CO., Ltd.
PALMERSTON HOUSE, LONDON, E.C. 2.
Telegrams: "PURIFICATION, LONDON."
Telephone: 9144 London Wall.

PUMPING ENGINES
All Types for ACID, &c.
CAST-IRON OR STEEL TANKS
Any Capacity.
CHEMICAL PLANT.
Roofs and Girders. Structural Work.
SULPHATE OF AMMONIA PLANT
Air and Gas Compressors.
MIXERS.
TAR STILLS AND CONDENSERS.
W. NEILL & SON, Ld.
Engineers, Iron & Brass Founders,
ST. HELENS JUNCTION.
Telegrams: 'Neill, St. Helens.' Telephone No. 20.

PURIFYING MATERIAL
"Brownox-de-Luxe."
Unqualified Satisfaction given where used.
SPENT OXIDE PURCHASED
J. BROWN & CO., Ltd.
Savile Town, DEWSBURY.

TORBAY
JOINT STOPPING
FREE FROM LEAD.
The TORBAY PAINT CO.,
26/28, Billiter St., LONDON, E.C. 3.
39/41, Old Hall St., LIVERPOOL.

"BLUEBELL"
SILICA RETORTS
(95% SILICA)
John G. Stein & Co., Ltd.,
Castlecary, SCOTLAND.

Makers of
GASHOLDERS,
TANKS (C.I. or Steel),
PURIFIERS,
WASHERS,
ROOFS,
&c.
ASHMORE, BENSON, PEASE & CO., LTD.,
STOCKTON-ON-TEES.
Complete GAS WORKS
London Office:
39, Victoria Street, Westminster, S.W.
Telegrams: "GASHOLDER."

W. & B. COWAN
(Incorporated in Parkinson and W. & B. Cowan, Ltd.),
LONDON. MANCHESTER. EDINBURGH. GLASGOW.
SYDNEY. MELBOURNE. BRISBANE. WELLINGTON, N.Z.

(See Advertisement on page III. of Wrapper.)

JAMES McKELVIE & CO.
Coal Owners,
Gas and Steam Coal Contractors,
17, RUTLAND SQUARE, EDINBURGH.
59, MARK LANE, LONDON, E.C.
GUILDHALL CHAMBERS, SANDHILL, NEWCASTLE-ON-TYNE.
24, CHAPEL STREET, LIVERPOOL.
ESTABLISHED 1840.

STEWARTS AND LLOYDS, LIMITED, 41, OSWALD STREET, GLASGOW. BROAD STREET CHAMBERS, BIRMINGHAM.
TUBES & FITTINGS for Gas, Steam, Water, &c.

ESTABLISHED — 1851 —
Telegrams: "DRY METERS, LONDON."
Telephone: KENSINGTON, 1140.

George Glover and Co., Ltd.
RANELAGH WORKS
Royal Avenue, Chelsea
LONDON, S.W., 3.

Highest Awards at the Principal International Exhibitions.
Branches at LEEDS (9, Dewsbury Road) and MANCHESTER (Gaythorn Meter Works, Easton St.).

SPECIALISTS IN DRY GAS METERS—SLOT, KEY, AND ORDINARY.
Every meter leaving George Glover and Co.'s works, irrespective of size—and they build up to 3000 Lights—is regulated and tested for soundness at 12 in. pressure, and for registration not only at the ½ in. pressure prescribed by the "Sales of Gas Act," but at 3 in. pressure with full outlet capacity, so as to prevent "slow" registration even when the meter is overworked.
AGENTS FOR THE PATENT M. & M. SELF-LOCKING SLOT METER PADLOCK.

W 669.

Length overall, 18 in.
Diameter of Reflector, 15 in.

Catalogues and Prices on application.

A LAMP OF DISTINCTIVE VALUE FOR Outdoor GAS LIGHTING

Fitted with 3 Medium Inverted Burners, each arranged with **PRE-HEATED CHAMBER.**

Outside Gas & Air Regulators.

Highly-finished Casing enamelled in dark green.

A Special Feature of this Lamp is that **NO INNER GLASSES** are required.

WELSBACH

OUTDOOR PRE-HEATED LAMP

BRITISH-MADE

ADVT. OF THE WELSBACH LIGHT CO., LTD., WELSBACH HOUSE, KING'S CROSS, LONDON, W.C. 1

B DONKIN D

GAS SERVICE REGULATORS

Patent No. 5093/08.

GAS METER REGULATORS.

STREET LAMP REGULATORS.

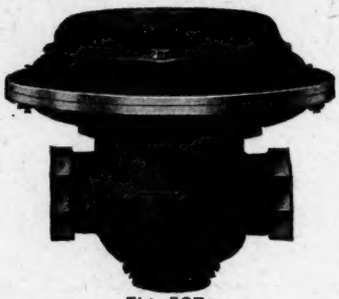


Fig. 587a.
For reducing the ordinary district pressure down to any outlet pressure from 1½ ins. to 5 ins.

Many Thousands in Use.

GAS FIRE & STOVE REGULATORS.

The Governors are also suitable for regulating the main supply of gas to gas engines.
High Pressure Type supplied for Higher Inlet Pressures up to 50 lbs.
No liquid or mercury seal floats. Do not require accurate setting. Constant outlet pressure maintained. Inlet pressure can vary over wide range. Regularity of light.
(High Pressure Type also for Higher Inlet Pressure.)
When ordering, state Outlet Pressures and Figure Number.

DISTRICT GOVERNORS. ROTARY & RECIPROCATING COMPRESSORS.

Regulators sent on Trial. Prices on Application.

THE BRYAN DONKIN CO., LTD.,

Head Office and Works, CHESTERFIELD.

London Office: 3, VICTORIA STREET, WESTMINSTER, S.W. 1.
Chesterfield Telephone No. 84.
London Telephone No. 5858 Victoria.
Chesterfield Telegrams, "Donkin Chesterfield."
London Telegrams, "Donkin Vic. London."

B CHESTERFIELD D

GAS JOURNAL

LIGHT ⁘ HEAT ⁘ POWER ⁘ BYE-PRODUCTS

[Founded in 1849 as the "Journal of Gas Lighting."]

EDITOR & PUBLISHER: WALTER KING. OFFICE: 11, BOLT COURT, FLEET ST., LONDON, E.C. 4.

VOL. CXLVIII., No. 2949.] TUESDAY, NOVEMBER 18, 1919. [71ST YEAR.

EDITORIAL NOTES.

An Impressive Stillness.

AN amazing silence came over the people of our great Empire at the eleventh hour of the eleventh day of the eleventh month of the year. It marked the time and the first anniversary of the signing of the armistice. Never has His Majesty the King made a suggestion which has found such a universal and sincerely sympathetic response as this of two minutes' silence, and which has produced such profoundly impressive effects. The object was not only for renewed thankfulness over the termination of a terrible war, but for remembrance for those noble ones who paid the greatest of all prices through their devotion to the cause of liberty. It requires no special two minutes to remember such sacrifice; it is an indelible memory. But the two minutes of solemn hush—in which all men, women, and children joined, in which there was no distinction, in which hearts were bound as one, and thoughts coursed in a single channel, when all in these islands stayed their occupations, machinery and traffic ceased, and everything was still where movement and din but a minute or two before had been, this alike in palace and cottage, in city street, and country lane—is to us all a significant and eloquent testimony to a common and living gratitude. From the gas industry many men have through the war passed away to the great unknown; and inquiry shows that officers and men alike in the British gas industry united as one in the great observance, and their thoughts were not only of lost kith and kin, but of working comrades. Only such machinery as it was absolutely essential should be kept running continued its operation, with the men standing by. Throughout the whole of the Departments of the Gas Light and Coke Company, the South Metropolitan Company, and the Commercial Gas Company, work ceased for that solemn brief space. The same in Glasgow, Edinburgh, and Belfast. The men in the South Suburban, the Wandsworth, Brentford, Croydon, and other suburban works were paying homage to our lost gallant ones simultaneously with the men at Manchester, Liverpool, Leeds, Sheffield, Bristol. In short, in no place in the industry do we imagine the request of the King was forgotten and unobserved. Let us quote from three, among many other, letters. Mr. Fredk. A. Price, Superintendent of the Manchester Corporation Gas Department, says: "The occasion was most "impressive; and it made all feel, for once in a way, the "real meaning of brotherhood." Mr. C. S. Shapley, the Engineer and General Manager at Leeds, writes; "The two minutes' silence was observed throughout the "department; the only plant not actually stopped being "the exhausters. The exhauster men stood by. I thought "the idea very good indeed, and most impressive. I un- "derstand that all other departments of the Corporation "observed it with the same solemnity." Mr. Cyril M. Croft, the Assistant Engineer of the Wandsworth Company, says: "The hooters were blown at all three works, and "all work suspended for two minutes, with the exception of "the exhausters and the power plant, which, of course, "could not be safely stopped. The stoppage was unani- "mously recognized by the men in the spirit in which it "was intended; and, I think, it was very impressive to all "employed by the Company." The men of the gas industry are second to none in their loyalty to living and dead.

Four Hundred and Fifty B.Th.U., and Other Matters.

GAS has had prominence in the House of Commons during the past week. The wag would say that it always has; but the variety in which we are concerned is that invaluable and popular commodity in which the gas industry deals. The great attention that is being paid to it in the places of public information is the best proof of its invaluability and popularity. The matters associated with it that are at the present time exercising part of the public mind are two—the quality and the price. Regarding the former, as was pointed out last week, pressure, the absence of provision for regulation on some appliances, and the smallness of internal fittings, are the real causes of complaint. But these are things on which the public are totally ignorant; and upon them gas undertakings will have to work, and that smartly, in order to correct false impressions, and produce satisfaction under the altered circumstances. The Order as to a maximum of 425 B.Th.U. no longer has application. There were not a few undertakings that were unable to work efficiently to it under the present conditions of their gas plant, and the existence of unregulated appliances. In these cases 450 B.Th.U. gas has been found a workable one, during this transitional period to greater economy—though the figure is not, as operating under different conditions elsewhere shows, to be taken as final in promoting the economical use of coal, and many engineers have reported that under it complaints have fallen to the normal level. This, however, is only a step to ultimate working efficiency in giving the public a good fuel gas as cheaply as the prevailing economic conditions will allow, and a gas that is also suitable for lighting by incandescent burners. No limits in respect of gas making and use can at the present time be placed upon the future. To do so would be simply to hamper progress; and this the Beilby report fully and justly recognizes.

In the House the other evening, the President of the Board of Trade was drawn on the subject of the position of matters regarding the calorific power of gas. An amusing thing is that questions are often put upon this subject of calorific power by men who could not define a B.Th.U., and who do not realize that a drop from 500 B.Th.U. to 450 B.Th.U. represents only a 10 p.ct. difference, and that this 10 p.ct. difference is not revealed under proper conditions of use to-day, due to the lower amount of primary air required with the lower calorific power gas, and the better admixture secured in promoting complete combustion. The information that Sir Auckland Geddes gave to the House referred to the Board of Trade suggestion to local authorities in June last, that they should refrain from taking proceedings against gas companies in respect of deficient calorific power in cases where it did not fall below 450 B.Th.U., and where the percentage of incombustibles in the gas was not excessive. This suggestion only operated until the end of October, at which time the instruction to gas companies was in existence as to the distribution of a maximum 425 B.Th.U. gas. But the conditions have again somewhat altered, though the difficulties of the situation have not disappeared, and there is a probability of a severe winter with reduced incoming coal supplies and short stocks. Sir Auckland now announces his belief that it will be necessary to renew until the end of April the suggestion as to the 450 B.Th.U., owing to the difficulties which have

been experienced in accumulating sufficient stocks of coal at gas-works to meet the demand for gas during the winter. By the end of April, the gas industry hopes that the new legislation, to be based on the report of the Board of Fuel Research, will be well advanced, so that progressively and uninterruptedly economy and efficiency may be served. Every aid that can be secured to this end both the industry and the public require, though the public naturally does not appreciate this (it will learn more later on) in the same way that the industry itself does.

A word as to inerts. The proviso to the Board of Trade's suggestion regarding 450 B.Th.U. gas was, "so long as "the proportion of inert constituents in the gas is not ex- "cessive." There has been, we know, some discussion in quarters that do not look with the most friendly eye upon gas undertakings, and seem to be desirous of doing all possible to thwart the industry's progress, as to what may be fairly taken to be an "excessive" amount of incombustibles. There are those who would have liked to have accepted the totally unfair 12 p.ct. in the original report of the Board of Fuel Research as the dividing line between unavoidable inerts and excess. And now we may expect—this not without reason—that the compromise that has been arrived at which will fix 20 p.ct. upon the industry for two years (with later 18 and then 15 p.ct.) will be taken as the level from which excess will be assumed to begin to accrue. Gas engineers may as well take note of this, and prepare themselves for any difficulty that may arise. This is our sole reason for mentioning the matter; for gas men need not be told that the industry is not surrounded by friends in numerous local administrations of the country.

To revert to the experiences that accompanied the change in the composition of the gas at the time of the railway strike, which brought about the need for reducing the primary air supply to burners. Some gas offices were then literally besieged by consumers who wanted to know what to do, and found that the reduction of the air-inlets of their burners would transform difficulty into good service. These experiences, we think, show that it would be a very prudent thing if all gas undertakings would consider at once the question of reorganizing their district staffs, and devise some scheme for dealing with the new circumstances. There is no doubt about it, such a course would pay, would pave the way to smooth working of permanent changes, and would generally inure to the interests of the gas industry.

The other matter that has been raised in the House during the week refers to the methods adopted in allowing increases of price under the Statutory Undertakings (Temporary Increase of Charges) Act. It will be seen from our "Parliamentary Intelligence" that Sir Auckland Geddes was able to assure inquiring honourable members that every opportunity is afforded to local authorities and other interested persons to make representations in opposition to applications for permission to increase gas prices, and that these representations, together with the financial and other conditions of the applying company, are thoroughly investigated by the Board of Trade with the aid of an accountant, before the application is granted. In short, the public are well protected; but, until new legislation is passed, gas share and stock holders are the sufferers. From their losses the public have been deriving advantage, unfairly.

Coal Carbonization Developments in America.

WHEN the Coal Carbonization Committee of the Ministry of Reconstruction reported, they deliberately said as little as they could, though coal carbonization is a subject that is seething with interest in this country to-day, and was then. It was the same with the Coal Carbonization Committee of the Institution of Gas Engineers. They and their work succumbed to something which could never be properly understood, unless it was sheer indifference. The Carbonization Committee of the American Gas Association in a report, of which we produce portions in other columns, find a great deal to chronicle. Our American gas confrères have during the past few years been taking vast interest in coal carbonization, though previously interest had sunk to a remarkable extent through the dominating influences of water-gas manufacture. But there, as here, the work of uniting the two processes (where coke-oven operation is not an influence) has of late years been an ascending force in practice, partly owing to the high price of oil, and to the unnecessarily relatively high standards which are insisted upon by the authorities there. It is hoped that rapidly advancing knowledge will do something to break-down this adhesion to a condition that is, viewed scientifically in relation to gas use, quite out of date.

A preliminary point that the Committee make is one that has for a considerable time past been urged in these columns. It is that the Committee believe that the adoption by the Association of standard methods for making and reporting tests would materially assist progress in the art of carbonization. And so think all students of the subject; for it is quite impossible under the variety of methods of stating results to make any accurate or sure comparisons. Not only are there frequently omissions, but items have an inconstancy of composition which kills all feeling of reliability. Besides often no information is given as to the coal used, and no analysis of the gas to enable one to check suitability and value. Much is required in this direction to get our carbonizing operations on to a scientific basis. There are some apothegms in the report. One is that the question of whether an installation of costly mechanical devices will pay in the amount of labour saved is secondary to the question of the ability to maintain service; and another is that there is no such thing as a carbonizing process that is best adapted to all localities. The first of these two submissions is one upon which there is no need to expatiate in these times of high wages, shorter hours, and labour unrest—not unrest perhaps so much in gas-works as outside, in industries on which gas-works depend for supplies. As to the second one, local conditions in respect of the most available coal, and the requirements for the primary and secondary products of coal carbonization, have all to be taken into account in making selection of the most suitable carbonizing plant. These are among the considerations that weighed with the Board of Fuel Research in making their proposal to shift the operations of the gas industry from adherence to a universal fixed heating standard to one of local selection that will contribute to economy and efficiency.

The outstanding features in the modern development of carbonizing practice in America are the extended use of coke-ovens and the installation of vertical retorts. Of the former, many large installations have been made where the combination of business opportunities rendered it possible to so allocate them as to supply gas to adjoining cities and towns; and the Committee urge that the problem of how to make the greatest use of this facility is one which should engage the best attention. This applies as much to this country as to America; for what has been done here, partially through fear of unreliability of supply, is small, and of a somewhat scattered and tentative character, in comparison with what has been accomplished in America. With, however, the licence that the home gas undertakings are promised in the matter of selecting the thermal value of their gas, we may expect to see much bigger developments in the utilization for town purposes of coke-oven gas, and a larger proportion of the total produced, as no doubt the development that is taking place in coke-oven construction and working in America, of utilizing (as is done at the Saltley Gas-Works, Birmingham) producer gas for heating the ovens, will follow here. Moreover, coke-ovens in the States are now carbonizing classes of coal that were formerly considered unusable.

The Committee include reports upon various installations of vertical retorts; but it is evident that there has not been the great rush for them in America that there has been in this country. We may suggest that perhaps this is partly due to the physical characteristics of the coal not being so suitable for vertical working as is a large proportion of coal in this country, and probably there has not been the same amount of supervision given to them in putting them into operation, and until those who are to have the responsibility of working them are fully conversant with the details of operation. The report makes a special feature of the Springfield plant, which is on the Glover-West system, and the results from which, with a full year's operation to their credit, have been completely up to the contractors' guarantees. There is a special feature about the Springfield settings. They are built of a carborundum material. We shall like to hear of more experiences with this material, which has a high heat conductivity. But, owing to the thinness of the walls of the retorts, some changes will have to be made in design. The bench, however, has not been in use sufficient time to say whether or not the material will be a success. Working has gone on for a sufficient period to say that the fuel consumption is much lower than in similar benches of other construction, and the capacity has been materially increased. This looks

promising; but we shall want to know more as to durability, which is a matter for time. The report is an interesting one, as it shows (with the paper noticed in the succeeding article) that substantial progress is being made in coal carbonization practice across the Atlantic, and that it is not without its lessons for us.

Steaming Abroad.

WHEN in France recently, we heard in conversation a good deal of the interest that our French colleagues are taking in vertical retorts and the steaming of charges; and there will be, when affairs become established, a large field in continental countries for the system, as a highly concentrated quality of gas is not the vogue there. During the war, too, through the coal difficulties in regard to price and supplies, much has been learnt there as to stretching gas in order to maintain supplies. Now we have the information in a paper submitted by Mr. L. J. Willien, jun., at the meeting of the American Gas Association, that there has been trial work in the steaming of verticals—both intermittent and continuous—in America, and that the results are of a mixed character. This country can claim to have been pioneers in systematic steaming; but it seems, from the (speaking generally) poor experience in the experimental work in America, that our friends there have not, in carrying out their trials, profited very much by the highly successful work done and the experience gained here. We realize the disability arising from the preference of those who regulate the work of gas manufacturers in the States for high calorific values per cubic foot rather than high calorific product per ton of coal handled, which means economy. And it appears that those who control have yet much to learn regarding the simple fact that—lower thermal value gas requiring less air for complete combustion than higher thermal value gas—the thermal value per volume of gas-air mixture at the point of combustion has marked identity. The fact that this knowledge has not gone home in the right quarters is not due to there having been no experiments made on the subject in America, because at the last meeting of the Institution of Gas Engineers, we heard from Major Strange that investigations in America had shown the coincidence of thermal value per volume of gas-air mixture with gases ranging down to 320 B.Th.U.

However, the experimental work detailed in Mr. Willien's paper, as we say, shows that America had not, before the trials were made, profited by the experience in this country. For example, it is impossible for maximum results to be realized if day by day different coals or mixtures of coals are used. That is disastrous to high efficiency. When a setting is tuned-up in regard to temperatures and speed of working, and steaming is regulated to realize high efficiency, with a certain coal or mixture of coals, then the coal or mixture must be adhered to, or the heating and operations must be altered so as to respond to the change made in the physical characteristics of the charges. The tests made in America have illustrated this, as was the case long ago in this country. There should now be a very close investigation to ascertain precisely why some of the installations have produced disappointing results with steaming; for we cannot help thinking, in view of the success in this country, that crude methods, apart from coal and high standards, are in a measure responsible for the disappointment. American gas engineers are not going to be content with indifferent results, or to fix their verdict on them, as there have been tests in America which prove the value of steaming. There are the Springfield tests made in the early months of 1917. With the coal used, without steaming, 12,500 c.ft. of gas was made of a calorific value of 540 B.Th.U; with steaming, 15,050 c.ft. of a thermal value of 519 was made. This means that there was a gain of 22·4 p.ct. in gas made, with a loss of only 3·8 p.ct. in calorific value. In other words, whereas without steaming 6,642,000 B.Th.U. per ton of coal were put into the mains in the form of gas, with steaming 7,810,950 B.Th.U. were distributable, or a gain per ton of coal of 1,168,950 B.Th.U. Better results still would be possible were it not for the very rigorous prescriptions as to quality. The data do not include the difference in the quantity of coke available for sale. A surprising point in the analysis of the coke is the small difference (0·49 p.ct.) in the volatile matter in the coke shown as the result of steaming, but the ash increased by 1·17 p.ct. However, we feel confident that, despite all opposing difficulties, we shall in time hear much more of vertical retorts and steaming from America.

Coke-Oven Gas for Sheffield.

THERE is every confidence in saying to-day that the use for public purposes of coke-oven gas in this country will extend, and that considerably. We know that certain large communities—Middlesbrough, Leeds, and Sheffield—as well as much smaller ones, are being supplied with a proportion of gas that is produced in coke-ovens. Middlesbrough consumers find great financial advantage from it; and the Sheffield Gas Company have been won-over to regarding coke-oven gas as an excellent auxiliary to their own manufacturing plant. They have now for nearly a year been receiving such gas from the Tinsley Park Colliery; and only recently we reported that the Company had entered into an agreement for a further supply from the Orgreave Colliery. This fact alone tells a tale of satisfaction, though when coke-oven gas was first mentioned, the Company did not take altogether kindly to the idea. A paper that Mr. J. H. W. Laverick read before the Institution of Mining Engineers last Saturday [reported elsewhere in this issue], threw a little light upon the business engagements between the Company and the Tinsley Park Colliery Company, who, it is clear, are keeping well up to their obligations, and are taking great interest in this fresh development. The minimum quantity the Colliery Company have to supply is 5 million cubic feet a week; but through nearly twelve months they have (omitting strike periods) been delivering an amount of gas which averages 7,263,860 c.ft. per week. "Omitting strike periods!" That is just the weak spot. Coal or railway strike periods are the very times when no coal deliveries are made to gas-works; and it is then above all periods that an external supply of coal gas would receive a warm-hearted welcome. Still strikes are not of everyday occurrence; and non-strike periods have much greater duration. The economy of the non-strike periods cannot therefore be sacrificed because of the short-time strike periods. The amount of gas supplied by the Colliery Company to the Sheffield Company, it is stated, is equal to 10 to 12 p.ct. of the whole quantity distributed by the latter; but this percentage is obviously going to be enlarged. The average calorific value of the gas is 509 B.Th.U. At the collieries supplying coke-oven gas to important centres, the development is turning the thoughts of the technical staffs into new channels. They are considering how this business can be enlarged. Mr. Laverick tells us that the proportion of coke-oven gas sold to that generated is about 50 p.ct. One way in which it is hoped to improve on this is by steaming. How would this affect the quality of the coke for metallurgical purposes? He has noticed, too, the development at Birmingham and in America of heating coke-ovens by producer gas. If this form of heating is adopted, it would release much more gas in the bulk of a quality suitable for use by gas suppliers. A point made by Mr. Laverick is that the railways or the streets or both are relieved of about 40,000 to 50,000 tons of coal per annum by the quantity of coke-oven gas supplied to the Company. We suggest that 30,000 tons would be nearer the mark. But it is a good point; and it is one that is made by gas suppliers in directing attention to the contribution to general economy made by the domestic use of gaseous in place of solid fuel.

High-Pressure Gas and the "Half-Watt" Lamp.

There have been renewed complimentary references lately to the excellence of high-pressure gas lighting for street illumination and outside shop lighting. The fluctuating flame arcs, with their bad diffusion of light, have had their day, and are gradually disappearing in favour, among those who prefer electric lighting, of the misnamed "half-watt" or gas-filled lamps. The sharp, offensive glare of these lamps, and the harsh concentrated light, have marked contrast with the soft, high-power, and well-diffused light of high-pressure gas-lamps. It is the high-pressure lamp—in large and small units—that will come more and more into competition with the gas-filled electric lamp. The area of the South Metropolitan Gas Company before the war was noted for its large and progressive adoption of the high-pressure system of lighting; and many people made a tour of inspection of the district to see for themselves. The Company's high-pressure plants have been restarted; and we learn on inquiry that, when all the orders in hand have been completed, there will be 3138 lamps of the following candle power in lighting: 512 lamps of 500-candle power; 2260 of 1000-candle power; 352 of 1500-candle power;

and 14 of 3000-candle power. This is excellent work; and the Company are to be congratulated upon it. We hope to hear of similar activity from other quarters; for although the light of the electric gas-filled lamp is not a good one, without it is well screened from view, and diffusing glass is used with it, the gas industry will have to employ for certain purposes its superior system of high-pressure lighting to compete with it. The gas-filled lamp has, of course, limited fields of use—for instance, it is no good for domestic purposes. Outside the limited fields, low-pressure gas lighting possesses merits, particularly in respect of quality of light and economy to pocket, which, with efficient attention to maintenance, should ensure continued stability and popularity.

A Partly Promised Coal Price Reduction.

Hopes have been rising and falling with regularity during the past week over an early reduction in the price of coal. It cannot be a big reduction at the pithead, with wages standing at about 21s. per ton, as against 6s. 3d. in 1914. The labour members of Parliament were discussing with Ministers on Tuesday the question of price; and they left quite convinced that the Government had made up their minds that a recession was possible. There was disappointment on Thursday when Sir Auckland Geddes declined to make a definite statement on the subject; but simply evinced a preparedness to do something if uncertainty was removed. If it could be said, he remarked, that there would be no stoppages, then he would be willing to recommend the Government to lower the price, not by 6s. per ton, but by "some much smaller amount." The last rumour emanating from labour circles is that the Government may announce a reduction of 2s.; and it is probable a statement on the subject will be made early this week. The miners are forcing the hands of the Government in this matter; and statements have been made—not officially by the Miners' Federation—that, if the Government do not reduce coal prices so as to contribute to the lowering of the cost of living, the miners will press for some further advance of wages. Output will take a large part in what the Government will be able to do. It is seen that during the week ending Nov. 1, the production was 4,674,532 tons, as compared with 4,761,037 tons in the preceding week—a falling-off unfortunately.

The Coal Owners' Portion.

The Government's financial plans in relation to the coal industry are based upon a fixed profit for the colliery owners of 1s. 2d. per ton; and it has been announced that a Bill is to be introduced to authorize this limitation. The coal owners are strongly protesting against what they describe as a great wrong to the investors of capital in mines. A deputation has had an interview with Ministers. What was said on the occasion is being kept absolutely private. But it may be fairly surmised that there was a good deal of straight talk on the subject; for (as will be seen from our "Miscellaneous News" to-day) the mine owners strongly resent the Government proposals, which they assert are both impracticable and unjust. The 1s. 2d., they point out, is only worth one-half what the amount represented before the war. Income-tax, too, is so much heavier than then, and will remain so—no one knows for how long. These are arguments that have been advanced from the gas industry more than once lately by those who have been suffering severely from the limitations to which they have been tied-down—limitations cast under the old economic conditions, and not the new. New capital will require more interest, will get it, and so will have a better market value than the old. The old capital in statutory concerns is going to be a sorry victim of the war; and the same cause is going to benefit new capital. The coal owners do not say anything about trying to get a co-partnership scheme introduced, to unite the interests of owners, men, and consumers. A sliding-scale of price, dividend, and wages—if a suitable scheme can be devised—should work to general advantage.

Pre-War Dividends as a Minimum.

An anonymous correspondent has written with reference to our article on "The Revised Terms" in last week's issue. We should have been pleased to have published "Shareholder's" letter, had he enclosed, in accordance with long-established rule. his name and address—not for publication, but for our information. The tenor of the letter is an expression of dissatisfaction with any scheme of financial revision which only gives to investors in existing gas capital the pre-war dividends, in view of the diminished value of money, the height of income-tax, and the better position in which new investors will be placed by being able to command higher rates of dividend. We are not much impressed by the very low prices at which gas stocks are at present changing hands, because these prices will undergo a material alteration for the better if the Board of Trade plans for doing justice to the industry are of an order which will carry out their expressed intentions. If the pre-war ordinary dividends could be made the minimum dividends, and be subject to a sliding-scale above that level, this would do much to help to restore market values, would do something to compensate for the reduced value of such dividends, and would assure the owners against a repetition of the dismal depreciation to which their holdings have been subjected. As to the Government taking over the gas industry and buying out the shareholders at par, we do not think the Government are in a mood just now for State trading. So fortunately it would be futile to try to push forward the question of gas nationalization.

PERSONAL.

Mr. THOMAS DANN, the Engineer and Works Manager of the Bedford Gaslight Company, having intimated his desire to retire, the Directors have granted his request, have given him a retiring allowance, and have offered him a seat on the Board. Mr. Dann has been in the service of the Company for forty-six years, for twenty-three of which he has occupied the position of Engineer. The Directors have appointed Mr. J. B. HANSFORD, Assoc.M.I. M.E., the Chief Assistant Engineer of the Barnet District Gas and Water Company, as his successor. Mr. Dann will probably retire early in the New Year.

The Christiania Town Council have unanimously appointed Mr. J. G. TOOMS permanently Administrating Director of the Christiania Gas-Works, with pension rights from the date on which he first entered their service—in August, 1915. It will be recalled that Mr. Tooms was originally appointed Chief Engineer for the building of a new gas-works at Christiania; and in March, 1916, he was, upon the death of the former holder of the office (Mr. O. Pihl), given the position temporarily of Administrating Director.

Alderman J. H. LLOYD was last week re-elected Chairman of the Birmingham Corporation Gas Committee.

Mr. A. J. LAMB has been appointed Manager to the Bentham Gas Light and Coke Company. He has been for a year in charge of the Bellingham Gas-Works.

Mr. W. BRADLEY, Assistant Manager at the Cork Gas-Works has been appointed Manager of the Tralee Gas-Works.

OBITUARY.

On the 10th inst., at Balham, after a short illness, there passed away MARIE JENNY, widow of Mr. WILLIAM SUGG, of Vincent Square, Westminster. The funeral service was on Friday, at the Church of the Ascension, Balham Hill. Mrs. Sugg was well known to a considerable number of the older members of the gas industry.

Southern Association Meeting.—At 2.30 on Thursday afternoon of this week, the Southern Association of Gas Engineers and Managers will meet at the Society of Arts, under the presidency of Mr. Frank Livesey, of Maidstone. The programme includes two papers—one "After Five Years' War," by Lieut.-Col. H. W. Woodall, of Bournemouth; and the other "Admixtures of Blue Water Gas and Coal Gas," by Mr. H. J. Randall, of York Town.

Temporary Increase of Charges Act.—Orders have been made by the Ministry of Health, under the Statutory Undertakings (Temporary Increase of Charges) Act, authorizing an increase in the maximum charge for gas, by the Abercarn Urban District Council, from 5s. to 7s. 6d. per 1000 c.ft.; the Appleby Corporation, from 5s. to 6s. per 1000 c.ft.; the Birstal Urban District Council, from 5s. 7d. to 6s. 9d. per 1000 c.ft.; and the Morecambe Corporation, from 4s. 6d. to 6s. per 1000 c.ft.

A Special Sub-Committee of the Blackburn Corporation Gas Committee last Wednesday considered the applications for the post of Gas Engineer, and eventually reduced the number from fifty to four.

At a meeting in Glasgow next Saturday of the Scottish Junior Gas Association (Western District), Mr. James M'Nicol, of Dawsholm, will read a paper on "Water Gas." There will be a visit on Dec. 13 to Messrs. William Baird & Co.'s coke-ovens at Dumbreck.

NATIONAL GAS COUNCIL.

Meeting of the Central Executive Board, Nov. 11.

A MEETING of the Central Executive Board of the National Gas Council was held on Tuesday last—Mr. D. MILNE WATSON in the chair.

Seaborne Coal for Gas Undertakings.—A letter was read from the Prime Minister, stating that he could add nothing to the communication addressed to the Council on Sept. 23 by the Ministry of Shipping, in which it was stated that it was impossible at the present time to consider the question of a reduction in freights. The meeting resolved to continue to press this matter.

Purchase of Private Wagons.—It was reported that the Council were collecting information from the owners of private railway wagons in connection with the proposed purchase of these wagons by the Ministry of Transport.

Workmen's Compensation Act.—It was reported that evidence had been given on behalf of the Council before the Home Office Committee on Workmen's Compensation, and that inquiries were being made of all members of the Council as to their practice in connection with their insurance of workmen against accident.

Electricity Supply Bill.—Reference was made to a clause in the Bill which empowers the Electricity Commissioners to "enter into arrangements for the utilization, for the purposes of the Board, of water power, waste heat, or other form of energy which the company or person may be able to dispose of, or for the supply by the Board of any form of energy other than electricity." An attempt had been made to ensure an amendment of this clause by the omission of the words "or for the supply by the Board of any form of energy other than," but the amendment had been lost. The Electricity Commissioners, therefore, could empower an electrical undertaking to supply gas. It was resolved to have an amendment moved at the report stage of the Bill.

Government Restriction on the Calorific Power of Gas.—It was resolved to place at the disposal of the Institution of Gas Engineers the information which the Council had collected as to the effect upon various undertakings of the Government restriction of the calorific power of gas to a maximum of 425 B.Th.U., under the "Gas and Coal Emergency Order, 1919."

ELECTRICITY SUPPLY MEMORANDA.

THE electrical papers do not like one little bit the proceedings at the annual conference of the British Commercial Gas Association. They have all commented on them. Ridicule has been poured out lavishly, the claims of the gas people are simple pretensions, electricity (with all its failings and uneconomy) is going to sweep everything before it, including gas. But in not a single instance is there anything advanced that proves that the statements at the meeting have not genuine foundation and structural reality. That is where electrical criticism of gas affairs so lamentably fails. It simply meanders round about central fact, which it does not venture seriously to attack. "Meteor" of the "Electrical Times" tries to be an exception, and shows that he possesses some very crude ideas as to heat units provided the gas way, and as to contemporary developments in the technical work of the gas industry, which at once enable the industry to change-over from the sale of cubic feet to B.Th.U., and only to charge for them. What the Board of Fuel Research has found, and has recommended the Government to adopt, "Meteor" thinks is a fit subject for him to ventilate his "little ideas" upon. The whole of the scientific talent comprised in the men constituting the Fuel Research Board—Sir George Beilby, Sir Charles A. Parsons, Sir R. A. S. Redmayne, Sir Richard Threlfall—is as nothing when compared with the evident measure that "Meteor" places upon the value and sanity of his own criticism. He does not mention the Fuel Research Board; but it is their report which is at the base of present gas movement and Government action. It is Lord Moulton's speech at the British Commercial Gas Association meeting that has prompted his pen——and brain.

Criticism.

Crude Electrical Argument.

Lord Moulton pointed to the use of gas being a most potent means of conserving and utilizing coal to the best advantage. It is agreed by "Meteor" that the public would certainly like to help in the attempt to save heat units. But, he asks, would it not be preferable for the heat units actually to be delivered in the first place? The present position, he says, speaks for itself. He notes that Sir A. Geddes has just put on record in the House the lower calorific value of 1919 gas as compared with that of 1914. "The Board of Trade quite agree with this reduction in heat units; the idea is to save coal." That is the correct reason; and it will allow the gas industry to produce more B.Th.U. in the form of gas from every ton of coal that it uses. But "Meteor" appears to think the public will be prejudiced, which shows his ignorance, and herein he will find a reason for future business transactions being based on B.Th.U. The statutory restrictions as to quality, and the refusal of the Government to cut themselves adrift from precedent, are the causes that have prevented this being done earlier. But the country is out for reconstruction and development; and the gas industry is ripe for both. The present Government have been shown something which their predecessors have refused to see. Science has shown them that the higher the quality of gas is in B.Th.U. the greater the quantity of air required to effect complete combustion. The lower the quality of gas within the limits of suitability for domestic and industrial use, the smaller the quantity of air needed for complete combustion. Therefore, whether the gas be high or low in calorific value, within the range set by the variety of uses and appliances, the calorific power per volume of gas-air mixture at the point of combustion is approximately the same. Now if "Meteor" will let this scientific fact sink into his mind, he will see the important bearing it has upon the future of gas production without in any way injuring the consumer, but benefiting him or her in the reduced cost at which the lower-grade gas can be produced, under the prevailing prices of materials and labour, compared with the restrictions imposed by obsolete enactment as to quality. "Meteor" also appears to be concerned over gas pressures. He need not be. They have not been just lately all that is desirable; and this is the real reason for the complaints of "bad gas," which is a misdescription. But the cause of the lower pressures has been not due to the gas suppliers, but to the shortage of coal supplies, and, where stocks exist, to the request of the Coal Controller that pressures should be reduced in order to further help economy. Naturally consumers who have hitherto had plenty of gas for all purposes feel the reduction of pressure, and at once assume the gas is "bad." It is not to the interests of gas suppliers to reduce pressures; but, for the time being, need commands. The forthcoming Bill, however, will provide for a minimum 2 in. pressure in the distribution system, in all mains and pipes down to 2 in. diameter. So "Meteor" has no occasion to worry himself about insufficient pressure in the future. Regarding the forthcoming Bill, he admits that he has "little idea"—the term suitably applies to his treatment of certain other matters—how the thermal system of charging can be adopted. But "the fact that such a Bill being essential in common justice to the British gas consumer supplies a rather apposite comment on Lord Moulton's praise of gas." As to the first part, that again is a matter over which "Meteor" need not worry; the system of charging has already been worked-out. As to the second part, the Bill is not required to secure "common justice to the British gas consumer," but to give practical existence to the advance of technical knowledge, and to make a change in the form of protection to the consumers of a nature incidental to the new conditions

A Brainy "Review" Article.

Another "brainy" argument, which amounts almost to an insult to Lord Moulton and Sir Dugald Clerk, is found in the "Electrical Review." Mentioning the parts that Lord Moulton and Sir Dugald took in the proceedings at the British Commercial Gas Association meeting, the "Review" says that "the very fact that it has been necessary to enlist men of their calibre in the capacity of gas advocates shows to what straits the gas industry is reduced to keep its end up." Does the "Review" sincerely think that men of such "calibre" would advocate anything in which they did not believe, and which their intelligence and scientific knowledge had not satisfied them was right? Only by answering the question in the negative can our contemporary remove the slur upon two eminent men conveyed by its words. Nor does their advocacy show "what straits the gas industry is reduced to keep its end up." On the contrary, it shows that these two eminent men have faith in the future of gas to such a degree that they can make known their conviction that, on several economic grounds, it will not only keep its end up, but will make very considerable and continued progress. The "Review" thinks another clever point is made by saying that the gas industry "has no difficulty in keeping its price up, and long ago passed the 100 p.ct. increase, while electricity supply averages about 50 p.ct." Why did it not give the "average" increase of the price of gas throughout the country? The Gas Light and Coke Company and the Commercial Gas Company did not "long ago" pass the 100 p.ct. increase; they are not there even yet. As to the suburbs, in 1914, the charges ranged between 1s. 9d. and 3s. per 1000 c.ft.; at the end of last year, they were between 2s. 11d. and 4s. 3d. Add (say) an average of 6d. for the last increase in the price of coal; and a 100 p.ct. advance in the price of gas is not shown. In "Field's Analysis" will be found the analyses of the accounts of eleven provincial corporation gas undertakings and of nine provincial gas companies. In 1914, the local authorities were charging between 1s. and 2s. 4d.; at the end of last year between 1s. 5d. and 3s. 4d. Making an allowance for the last increase in the price of coal, a 100 p.ct. advance in the price of gas is not even then shown. Take the nine provincial companies. In 1914, they were charging prices varying between 1s. 1d. and 2s. 9d.; at the end of last year, 2s. 3d. and 4s. 2d. An allowance for the last increase in the price of coal will not make in their case a 100 p.ct. advance in the charge for gas. We could quote individual cases which are also a denial of the assertion of the "Review;" but the figures already given will, we think, shake its confidence in itself as an authority on this matter. Now, as to the 50 p.ct. increase in electricity supply, what of the undertakings that have gone up to 9d., 10d., and 1s. per unit, and the many more that are struggling not to exceed their authorized maximum? The rest of the "Review" article consists of loose, inconclusive, and vague statements; but it declines to get at close

grip with facts, and to contest them in an open manner. It tried to do something of the kind just recently, but made a sad mess of it, as was shown in the "Memoranda" for Nov. 4.

More Evasion of Cardinal Facts.

The "Electrician" has also an editorial on the meeting, and quite unnecessarily acknowledges that it deals in "a somewhat flippant spirit" with the work of the Association, so far as the work is reflected in the papers read at the Conference. But why deal with it in "a flippant spirit?" Had not the men who read the papers sufficient status for the editor of one of a family of technical papers (of which a gas contemporary is a prominent member) to treat the proceedings in a serious manner, or was the material they presented of such a low order of merit that it deserves no better consideration and argument from an electrical editor than flippancy? Let us call attention to a few of the points that this indulger in editorial flippancy put forward in this effort of his. He remarks that "Sir Dugald Clerk's figures should be studied, not because we admit them to be true, but because they will form a useful basis of argument for electrical propaganda." The flippant one would have better served his paper and the electricity supply industry if he had categorically shown where Sir Dugald's statements are untrue. He does, however, submit that calorific value is not the only thing to be considered; but ease of distribution and mere convenience have to be thought of. What is wrong with the ease of distribution of gas, its convenience, its economy, and its efficiency for the purposes to which it is applied? It is a puerile argument to write: "For that reason [the ease of distribution and the convenience] we do not fear any great rush of power users to replace their motors by gas-engines, or by theatre proprietors to instal the inverted mantle instead of the metal filament lamp for lighting their stages." As to motors, never in the long history of the gas-engine trade has so much business been done as in the last few years; never in the history of power competition have manufacturers known so much about the superior economy of the gas-engine in long-hour work with a fairly constant load, and that the electric motor only excels in convenience for intermittent running. We are justified by current movement in the opinion that in the future, under the new latitude of gas-manufacturing operations, the industrial acknowledgment of the respective fields for the two power agents will be still more pronounced. As to the requirements for stage lighting, theatre proprietors would be fools if they did not use the more convenient light for their particular requirements. Everything has a superior suitability for something or other. There is no need to comment on other parts of the article which have a weight and a value about equal to the sentences to which reference has already been made.

How Hastings Manages.

Ever since the transfer of the Hastings electricity station to the Corporation, we have taken an interest in its management and fortunes. The position just now is peculiarly interesting. The annual accounts have just been published. They are rather late; but perhaps it was difficult to drag into the light of day the serious fact that the undertaking shows a loss upon the year's trading of £6800 (which is the biggest deficit ever recorded, and it makes the total deficiency to date £35,321. For the past three years, to meet increased costs, the price of current was advanced 20 p.ct. all round. Lately this has been absurdly inadequate; and now an Order made under the Statutory Companies (Temporary Increase of Charges) Act will entitle the charge for current to be advanced 50 p.ct. The 20 p.ct. advance last year brought in £3109; so presumably, and without allowing for the accumulated deficit, the 50 p.ct. should more adequately meet the increased expenses. The loss during last year (£6800) means very nearly a 5d. rate; and the rates are up as it is. It is, therefore, an extraordinary position to continue—that, because the electricity undertaking is worked with public money, the whole body of ratepayers should have to subsidize it in this way, and provide electricity in competition with gas at the expense of a good many who do not make use of electricity. There are one or two other unpleasant points. Notwithstanding the deficit last year public electric lighting represented £1998 of the revenue, against £690 the previous year; and notwithstanding that the concern was being run at a loss, there has been no hesitation in raising capital from revenue—in other words, doing work out of revenue which really, in the case of an electricity undertaking, is strictly capital. It will be remembered that some attempt was made to secure equity in regard to the restrictions imposed upon gas and electricity undertakings; and one thing that was done was the refusal of loans for electric mains and services. Hastings, however, appears to have an easy conscience in these matters. In the last three years, in each of which there has been a varying deficiency, the following amounts have been appropriated from the revenue: £532, £607, and £611. In the last two years, the amounts are specifically given as house services and meters. Thus the Gas Company provide some of the money for the "opposition shop." Just at the present time the electrical people seem to get meters easily; whereas the gas industry is in trouble day by day for the want of meters. Last year, despite restrictions, the Electricity Department connected 140 additional consumers; and very many of these without doubt could not be justified from the financial point of view. The Chairman of the Committee, however, apparently thinks that the only thing that matters is the number of consumers; and, if this increases, "all's well," regardless of who may have to pay for his ideas of commercial facts. The revenue suffers badly because so much current is sold at the lower rates. Last year, for instance, very nearly as much current was sold at 1½d. as at 6½d., *plus* 20 p.ct. in each case. The result of this has been that, while the costs per unit sold have been ascending rapidly year by year, the average return for the past three years for current sold to private consumers has been 5·44d., 5·20d., and (now) 5·07d. per unit. Since this, of course, the 50 p.ct. increased charge has come into operation; but it is certain that no company would have dared to carry on business on the lines stated, though, naturally, with Corporation property, standing charges do affect the question. For instance, in 1917, the total works costs were 3·6d.; but, owing to the increased consumption of current, they went down to 3·28d. in 1918. Last year they were up to 4·13d., owing to increased costs.

FIRST ANNUAL CONVENTION OF THE AMERICAN GAS ASSOCIATION.

[Communicated.]

Thirteen years ago your columns told of the first annual meeting of the American Gas Institute; and no one in attendance at that great assembly in Chicago but thought the gas industry in the United States was at last equipped with an organization to serve it well for many years. In the world's history, 1906 is far indeed removed from 1919; and among the lesser changes in the epoch-making interval, we have already recorded the merging of the Institute into the Association. The latter, formed last fall, held its first gathering—an informal conference—this spring; and now, with headquarters staff fully organized, it holds its first formal convention and exhibition—choosing for its meeting place the Hotel Pennsylvania, New York City. This, the largest hotel in the world, with its 2200 guest rooms and all else in proportion, was a fitting host for this, the largest gathering of gas men ever known.

The convening time was set for ten o'clock on Tuesday morning, Oct. 14. This indicated Monday evening as the convenient arriving time for those coming from beyond the immediate vicinity of New York City. To add some additional incentive to such early arrival, the President (the Hon. George B. Cortelyou) held a reception that evening, followed by a dance and supper. This was attended by several hundred; the sexes being equally represented, and the dancing continuing until after midnight. It was a very enjoyable beginning of the social side of the convention—a side that has always played an important part in our Association meetings, and has helped greatly in building-up a spirit of good fellowship throughout the industry.

When the President called the general session to order on Tuesday morning, he was faced by a large audience, which soon numbered upward of 500. The first item was to hear the report of the Membership Committee, showing 302 member companies, 151 manufacturers, and 1651 active members. The latter are enrolled in one or more sections as follows: Accounting, 719; Advertising, 191; Commercial, 1046; Manufacturers, 650; Technical, 1038.

International Courtesies.

Responding to the graceful courtesy of the Institution of Gas Engineers in electing Mr. Cortelyou as an Honorary Member, the Association voted this distinction to Sir Dugald Clerk, and coupled with his name that of the President of the Société Technique du Gaz en France, M. Laurain.

Representation.

The Secretary-Manager in his report said that the gas company members represented 70 p.ct. of the gas capital, but only 30 p.ct. of the companies, and that a determined effort would be made to enrol the smaller companies, not only for the benefit resulting to them, but also because of the advantage to the Association of being more nationally representative. There were twenty-three general, and twenty-five sectional, committees at work; and the attempt would be towards fewer papers and more committee work of a permanent nature. The compilation of valuable data was contemplated. A general information service was now being carried on.

Finances.

The Treasurer's report listed receipts of $111,000, with assets of $51,000, of which $38,000 were invested in Government bonds. Salaries were $31,000. These figures are impressive, and reveal the Association as very well equipped financially to carry out its mission.

The Presidential Address.

In the absence of Vice-President Holman, President Cortelyou called Mr. Arthur Hewitt, of Toronto, to the chair during the reading of his annual address. The address was devoted mainly to a consideration of the Association's affairs; and the text here was: "Every one owes something to his profession." Considering the problems that confront the gas companies, he emphasized the necessity of setting the house in order in connection with both the clerical staff and the labouring force. Adequate employment conditions, if not now present, must be provided, with whatever adjustment of wage that was required. Every employee should have an opportunity for self-development; and the Association

should help in this. For the present abnormal world condition, the only real cure was hard work, frugal living, and economical government.

The address, which was received with prolonged applause, was referred to a Committee for consideration and report. It was followed by the ratification of certain amendments to the Constitution and Bye-laws.

OFFICE HOLDERS.

The report of the Nominating Committee, which was unanimously adopted, was as follows:

President—G. B. Cortelyou.
Vice-President—Rufus C. Dawes.
Treasurer—W. H. Barthold.
Directors (to serve two years)—D. D. Barnum, R. B. Brown, Howard Bruce, Arthur Hewitt, C. L. Holman, J. B. Klumpp, A. B. Macbeth, H. A. Norton.

The officers elected by the various sections are for convenience given at this point:

Accounting.	*Manufacturing.*
A. P. Post, Chairman.	W. G. Gribbel, Chairman.
A. L. Tossell, Vice-Chairman.	G. S. Barrows, Vice-Chairman.
Commercial.	*Technical.*
C. A. Munroe, Chairman.	L. R. Dutton, Chairman.
J. P. Hanlan, Vice-Chairman.	W. S. Blauvelt, Vice-Chairman.

No election was had in the recently-formed Advertising Section, the old officers holding over.

PAPERS AND REPORTS.

Mr. W. H. Gartley then read a paper on "The Value of the Chemist to the Gas Industry as a Whole, through Research Work and the Development of Bye-Products." He called attention to the coming period of scientific research, and wants co-operation between the gas companies now doing any of this work. Also the Association could with advantage render research work more far-reaching, but less immediately productive in practical results, than that now carried on by any gas company. He listed some of the questions relative to oil and coal that were awaiting definite answers. Among them was that of low-temperature carbonization.

New York City was selected as the place for the 1920 convention; the time to be about the middle of October.

The Committee on Accident Prevention submitted statistics to show that, in the matter of fatalities, the gas industry was three-and-a-half times as safe as thirteen other national industries, and with only half the number of minor accidents.

Captain W. E. M'Kay presented an interesting report of the Association's activities as a member of the Chamber of Commerce of the United States. This closed the first session.

At the second general session on Wednesday morning, Mr. F. N. Sisson, Vice-President of the Guaranty Trust Company, told about "Creating a Market for Utility Securities." These securities for gas companies amount to some four billions. Not only are the public under a moral obligation to support them; but cities cannot be prosperous unless such support is given. In connection with all public utilities the problem in this country is: "Can Democracy deal justly with all its classes without especial favour to any?"

Mr. C. A. Munroe, the Vice-President of the Peoples Gas Light and Coke Company of Chicago, spoke of the "Unsold Market for Gas (Industrial)." He listed a number of uses of gas as a fuel; being mostly processes where close temperature regulation is required, in which the advantages of the gaseous fuel are so great that cost is no deterrent, and its adoption is certain after knowledge of its advantages. There is a still larger field where cost is a controlling factor, and to win which more efficient utilization is required. He believed the Association should establish a laboratory for the development of the proper apparatus. The discussion brought out the high cost of such a laboratory to be effective, but also emphasized the wonderful field awaiting the use of gas in the industrial field; and it is quite probable that an Association laboratory will be forthcoming.

The session closed with brief statements from the Chairman of the Commercial, Manufacturers, and Technical sections of the work done by their organizations during the past year.

On Thursday morning, the general session opened with an address by Mr. N. C. Kingsbury, the Vice-President of the American Telephone and Telegraph Company, on the "Influence of Publicity in Establishing Relations between Utilities and the Public." His text was that, if civilization is to continue, there must be the fullest co-operation between all classes. Each one must work at his own job, but must also know enough about the job of the other man to give him all needful co-operation. In these days, advertising is the only way to diffuse such knowledge; and the Telephone Company is spending over two millions a year in this work, with most gratifying results.

Mr. Kingsbury was followed by Mr. George Williams, the Chairman of the Association's newly-formed Advertising Section, who explained its present plans of beginning in a modest way its campaign of educational publicity. He quoted the good work done by the British Commercial Gas Association. The section desires to be a clearing house for all local publicity and advertising work of its members; and he strongly appealed to them to send in all such copy. The section also stood ready with advice in the preparation of copy.

The regular order was interrupted at this point to listen to an explanation from Mr. Joseph H. Choate, Jun., of the legislation now pending in Congress to protect the new American dye industry from German competition. The Association recommended this question to its Executive Board for early consideration and appropriate action.

In "What are the Needs of the Industry?" Mr. H. L. Doherty touched on many subjects. He believes the future of the industry lies in the substitution of gas for solid fuel. He feels that the profession as a whole has been lacking in vision. He recalled his attempts in England in 1913 for benzol production from gas by removing the light oils, and stated that the only opposition to the process (afterwards universal as a war measure) came from the gas companies. He believes that had the proper effort been forthcoming, gas to-day would be made at the pit mouth; for the problem of power transmission in this way presents less difficulty than does that of electricity.

The Committee on the President's Address emphasized especially the features that bore on the relations between companies and employees.

The session closed with the thanks of the President for the prompt and interested attendance featuring the three mornings. He spoke of the Association as facing forward and alive to the needs of the industry. This terminated the convention from the standpoint of the Association as a whole; but the last section (Commercial) meeting did not adjourn until Friday noon. These section meetings were held on Tuesday, Wednesday, and Thursday afternoons, nominally from 2 till 5 o'clock, but in the case of the Technical Section often lasting until almost six o'clock. The attendance at the sessions of the Commercial and the Technical Sections averaged about 200; and the Manufacturers and Accounting Section had perhaps half as many. These figures will give an idea of the quantity of work accomplished in the four days of the meeting. Due to the physical limitations of a single observer, this account is confined to the Technical Section.

THE TECHNICAL SECTIONS.

The first session of the Technical Section was opened at 2 p.m. on Tuesday afternoon, by the Section Chairman, Mr. J. B. Klumpp. The other sessions were held on Wednesday and Thursday afternoons; the duration of each session being over three hours. When it is stated that discussion had to be curtailed for lack of time, it will be appreciated how much business was transacted. In what follows no attempt will be made to describe each session separately.

In his opening address, Mr. Klumpp appealed for still fuller co-operation by each member in the great field of work ahead. He spoke of the personal and professional advantages to be derived by everyone engaging in Association work, especially as done by committees; and he invited suggestions for such work. Then followed the election of section officers for next year.

The report of the Carbonization Committee was presented by the Chairman, Mr. J. A. Brown. It was comprised mainly of appendices describing the principal carbonizing installations made since the date of the last report in 1916. It listed the conditions affecting the choice of a carbonizing process.

"The Bye-Product Coke-Oven and its Place in the Gas Industry" was presented by Mr. A. H. Harris, Jun., being considered under the following heads: Present status; effect of enormous increase of bye-product ovens upon the gas business; possible substitution for natural gas; reason for the erection of ovens; how they can be utilized for supplying gas; and a comparison of operating results. An hour's discussion followed; for our engineers are keenly alive to the fact that many of them may soon have this question to decide for their own situation.

Mr. L. J. Willien, Jun., in "Progress to Date on Steaming Retorts—All Types," gave a lot of information on this subject, much of it in the form of result tables taken from the "JOURNAL" columns. As the author says, "Very little work has been done in the United States on the steaming process, principally because the gas companies are handicapped by having to meet either a candle power or an unusually high calorific standard."

The report of the Committee on Consumers' Meters, presented by Mr. George Wehrle, the Chairman, contained regulations for capping inlet and outlet pipes of meters out of use, and for certain proof tests. These were adopted after a lively discussion had shown the necessity for the additional work involved, compared with present practice.

"A Sampling Device for the Investigation of Water-Gas Operation," by Mr. R. A. Carter, jun., described a device to obtain from any water-gas machine a sample truly representing the product of the machine in quantity and quality. The author was subjected to much questioning; and his claim of obtaining a dependable quantity result was not allowed.

The facts regarding "Revivification in Place," and a summary of information obtained from a number of the larger companies, were submitted by Mr. O. B. Evans. The scarcity, uncertainty, and increased expense of labour have made it essential to reduce oxide handling to a minimum.

The Committee on Cast-Iron Pipe Joints, of which Mr. G. I. Vincent is Chairman, recommended a modification of the standard bell for use with a cement joint or with a combination lead-wool and cement joint, with especial reference to pipes 12 in. and larger in diameter. This design, through increased bell depth and a bell diameter increasing from face to back of bell, will, it is believed, enable the making in any size of pipe of a cement joint

that will remain tight indefinitely. Should this prove true, not only will the cost of jointing be greatly reduced, but also, as was brought out later in the meeting, danger of electrolytic destruction will be largely removed. The recommendation for the new design was concurred in by the Committee on Cast-Iron Pipe Standards (of which Mr. Walton Forstall is Chairman), and was accepted by the meeting.

The Committee on Refractory Materials (Mr. H. L. Underhill, Chairman) is working on spalling tests and methods for the determination of thermal conductivities. It presented a communication on the use of veneered silicon carbide bricks in a water-gas generator. Present conclusions are that solid bricks would probably be more successful; but the veneered block gave promise of successful results.

Mr. L. J. Willien, Jun., as Chairman of the Committee on the Disposal of Waste from Gas Plants, announced that information was being gathered in England, where the subject had received more consideration than we have hitherto paid to it in this country. The Committee is ready to advise to the extent of its ability any company with a waste disposal problem. As showing the stringent requirements in connection with any chlorinated water supply, it was stated that in such a supply one part of phenol in five hundred million would cause an objectionable taste.

"Regulating Pressures from Transmission or Pumping Mains into Distribution Mains," by Mr. G. T. Macbeth, referred to an installation of 75 miles of pumping and 500 miles of distribution mains, and brought forth some favourable testimony as to the reliability of a well-installed system.

The Committee on Electrolysis (Mr. J. D. von Maur, Chairman) presented a very good report. Many examples of damaged gas structures were shown, with especial reference to joint corrosion. There were tables of joint resistances, bringing out very strikingly the advantage of a cement joint in making a line of such high resistance that the current carried was too slight to create any appreciable damage. It advocated the formation in each city of an Electrolysis Committee composed of representatives from each interested company. Such Committees in connection with adequate surveys of stray current conditions had proved their value in several places.

"Dust Deposits in Mains and Services," by Mr. C. R. Henderson, brought out the testimony that his troubles were more or less chronic, though generally in a mild degree, in all high-pressure systems delivering coal gas with no recovery of cyanogen. One speaker has found prussian blue 75 miles from the gas supplying coke-oven plant.

For the Chemical Committee, its Chairman, Mr. E. C. Uhlig, spoke of the endeavours to interest all gas company chemists in the progress already made in revising the "Gas Chemist's Handbook" issued some years ago by the American Gas Institute, and of the current work being done of publishing in the Association monthly abstracts of chemical articles valuable to the industry.

"A New Heating Value Indicator," described and exhibited by Mr. E. J. Brady, was very favourably received. This enables a determination of heating value with an error not exceeding 2 p.ct. in a few minutes' time, and will be of great aid to gas makers by giving them instant information as to the heating quality of their product.

"The Value of the Chemist in the Large Gas Plant," by Mr. E. J. Murphy, and "The Need and Value of the Chemist in the Small Gas Plant," by Mr. H. Vittinghoff, brought to an end these very interesting and instructive technical sessions.

The Social Side.

Passing from work that was in itself a pleasure to pleasure devoid of weariness, we come to the banquet and dance on Wednesday evening. The toast-master was Mr. Arthur Hewitt—of Toronto—as well known in the United States as in Canada. His position, and the remarks of the speakers, emphasized the strong bond of affection and admiration that unites us to Canada and no less to your own great nation. The keynote of the evening was co-operation—between nations, between industries, and, in a still greater degree, between fellow workers disregarding class distinctions. Probably never was there a festive gathering so imbued with the spirit of service. The ladies added an inspiration by their presence; and if their unflagging zeal for dancing is any criterion, they will always do their part.

If space permitted, much might be said as to the exhibition of appliances for the manufacture and utilization of gas as shown by a hundred manufacturers. Here was a splendid opportunity for the gas manager to see the most modern devices offered for his acceptance.

By those of us who have for a quarter-of-a-century or more followed the meeting of gas men in this country, this gathering may be properly described as "not only largest but best," and to hold great promise for our well-loved profession. The renewal of energy arising from contact with our fellow workers, and the yearly increasing pleasure in greeting old friends, is a convention bye-product, increasing in value with the years of our pilgrimage.

The annual general meeting of the Yorkshire Junior Gas Association is to take place next Saturday afternoon in the Leeds University. At the close of the general business, a lecture on "The New Times" will be given by Mr. Walter Hole, Superintendent of the Leeds Gas-Mains and Distribution Department.

ALTERATIONS IN PRICE OF GAS—AND THE CONSUMER.

By Norton H. Humphrys.

Undoubtedly there are, and have been, numerous instances of unblushing profiteering that may well engage the attention of specially appointed Committees. Even the Government itself is not clear in this respect, as witness the latest exposure in connection with the regulations as to the price of coal. But as often happens, the innocent suffer with the guilty; for public opinion has risen to such an extent that there is a disposition to regard a higher price as practically the same thing, irrespective of the merits of the case. Action in this direction, especially as applied to public utilities, is followed by the parrot cry of "profiteering," unless accompanied by an explanation that will appeal to the general public sense of fair trading.

The average purchaser of gas or any other marketable commodity is not obsessed with blind opposition to a figure that will cover increased working expenditure; nor does he desire to cut down profit below that erratic condition known as "a living wage." But, apart from profiteering, he does object to anything that savours of a high hand, such as a retrospective advance without notice or explanation; and he is especially susceptible to the suspicion that in some unexplainable way he is being "done." Influences of a political nature may occasionally override the usual (or should we say that which was formerly the usual) standards of commercial truth and honesty—being attended with exaggeration, distortion of fact, suppression of truth, and even intentional misrepresentation. An extreme man can only look at things from his special angle. Few gas undertakings can claim to have never been up-against experiences of this kind; and they are subject to the general attack on vested interests as a class that is one feature of to-day's practical politics. But all things of this nature are in the minority. The bulk of customers only require to be satisfied as to a fair deal as between man and man.

Much of the present unrest is due to the predominance of impersonal over the personal element. We hear too much about Capital, Labour, Railway Interests, Gas Interests, and such like intangible figments that are without soul to be saved or body to be kicked. And so we find individuals who, as such, would have no difficulty in arriving at a satisfactory understanding, kept at arm's length by the machinations of combines and unions, to the great disadvantage of all parties concerned—the workman, the producer, and the consumer.

If Mr. Smith and Mr. Brown fail to come to terms over a business transaction, before calling in any third party, who may claim to be able to look after their interests better than they can themselves do so, they have a personal interview; and in nine cases out of ten they arrive at an amicable understanding. An apparently irreconcilable difference may be readily adjusted. But directly third parties enter in any form, two things happen. The personal interview has the effect of whittling-down the points at issue. But now the breach is widened by the introduction of matters more or less irrelevant; and the arrival at a satisfactory settlement becomes much less probable. We can imagine that if Messrs. Smith and Brown, as an alternative, placed the whole position at the control of a meeting attended not only by the employees concerned, but also by outsiders, who for various reasons desire to utilize the position as a means of serving their own ends—perhaps to increase the cause of dispute rather than reduce it, and enforce a settlement more in accordance with their own ideas than with the true interests of the parties concerned. And the outsiders, being experienced in the control of numbers, may force a decision that is not agreeable to either of the principals.

The success of the British Commercial Gas Association is very largely due to full recognition of this point, and cultivation of the "personal" element, by the replacement of the impersonal "company" and the blind administration of regulations that resemble the laws of the Medes and Persians, by duly credited and competent representatives. Business that formerly dragged heavily between the "company" and Mr. Smith (a consumer) now travels smoothly towards mutual satisfaction between Mr. Smith and Mr. Brown, of the sales, show-room, or complaint departments. The object of this communication is to suggest that the same mutual confidence might with advantage be extended to the cashier's counter, and take in the general question of selling prices.

War conditions have placed an entirely new complexion upon alterations in price of gas. For many years, so long as most of us can remember, they have been few and far between, comparatively trivial, and most of them on the down-grade. Questions may be asked about even a small advance; but not much is said about a reduction, beyond the assertion that it might well have been greater. Not even "thank you." A matter of 2d. or 3d. per 1000 c.ft. does not attract much attention. But now, at a time when prices of all sorts are in the limelight, we have advances totalling anything up to 3s. or more per 1000 c.ft. The usual plan has been to make alterations with what may without offence be termed scant courtesy—just the bare announcement, at best only one or two brief explanatory sentences. But even the effect of 2d. reduction would be enhanced by a more extended, but not lengthy, explanatory leaflet—not based on the lines of similar attempts on the part of the Government, but favouring the easy conversational or colloquial style that would commend itself to

Mr. Smith and Mr. Brown. Much bad feeling, misrepresentation, and consequent drag on the progress of business would be thus avoided.

The unfortunate holder of shares in several gas undertakings, on comparing the latest reports with those issued in 1914, will find that, apart from currency depreciation and tax deductions, the rates of dividend have been reduced to a ridiculous and unjust figure, which not only affects present income, but future prospects. The effect as regards carrying out extensions and raising additional capital has not received the attention that its importance demands. If the industry cannot go forward, it must go back. And turning to his daily paper, he may find much wild assertion about gas "profiteering," increased receipts for residuals covering the entire additional cost of materials and labour, bare comparison between the cost of coal and the price of coke, &c.—not made by the man in the street, but put forth on authority by Members of Parliament or town councillors, who are supposed to get first-hand information and to know what they are talking about. As a fact, they expose crass ignorance, and if taken as an example of the intelligence (!) with which public business is carried on, fully explain the awkward exposures that have come to light in connection with the price of coal and other matters under Government control.

Much of this ignorance can be laid at the door of the gas undertaking, as silence or indifference conveys the impression that there is not a sound case for the defence. Explanations delivered across the board-room table do not travel far. Outside the gas offices, who properly appreciates the effect of coal restrictions upon the finances, which in some cases have been more pronounced than those of any other war condition? By bare arithmetic, the value of coal is now two-and-a-half times that obtaining in 1914. But currency is not the only thing that has depreciated; and if the value received is considered, the ratio will be more like 4 : 1.

An explanatory leaflet, to be given to each customer, and posted conspicuously in the gas offices, should preferably not follow a set form, but be adopted to fit the circumstances of each case. As an example, the following, which has been well received by consumers, may be added.

Gas Works,

.....

July, 1919.

THE PRICE OF GAS.

The gas company have to face another large increase in cost of coal, bringing the price up to two-and-a-half times the average pre-war rate. Other materials and labour have advanced in like proportion. Under such conditions they cannot sell gas at anything approaching pre-war terms, and can only meet the case by increased selling prices.

The meters will be read as nearly as possible on 1st August, and as from that reading the price will be.....per 1000 c.ft. As compared with 1914 prices this is an advance of.....p.ct.—less than half the increased cost of manufacture; the balance is met by economies in working, the higher price of coke, and reduced profits.

By order of the Directors,

.....

Secretary.

Since the above was in type, the American gas papers, containing reports of the meeting of the American Gas Association, have come to hand. They indicate a position similar to that of the gas undertakings here—dividends cut below a figure that will ensure new capital on fair terms, and high prices of material and labour. The necessity for publicity, a true presentation of actual fact, was a leading feature in the papers and discussions.

Working-up Tar Products in Germany.—It is stated by Prof. H. Grossmann, of Berlin, that possibly Germany may be made entirely independent of imported tar-oils by the use of the Bergin process, which renders possible the working-up of tar and tar products (including pitch) into very valuable materials, by subjecting them to the action of hydrogen. It may also be found possible to submit the raw coal or lignite to the action of hydrogen in such manner that oil and benzene are obtained directly. The solution of this problem will put Germany upon an entirely new footing as regards its supplies of combustible material and of power.

North of England Gas Managers' Association Auxiliary Meetings.—The Committee of the North of England Gas Managers' Association are allowing their junior members to hold two half-yearly auxiliary meetings, open only to members and associates who are not eligible for the Special Purposes Section. These auxiliary meetings are worked by a Committee of six, who have their own Chairman and Hon. Secretary. There have already been two meetings, of which Mr. Norman Reid (Works Manager of the Redheugh Gas-Works, Newcastle-on-Tyne) was the Chairman. Another meeting is to take place next Saturday, at Sunderland, under the chairmanship of Mr. J. E. Morfett (Distribution Superintendent of the Sunderland Gas Company), who will deliver an address. There will also be an inspection of the show-rooms and distribution department in Hind Street. The Hon. Secretary to the Auxiliary Committee is Mr. A. H. Bagshaw (the Works Manager at Hendon Gas-Works, Sunderland). These meetings are, of course, altogether apart from the ordinary meetings of the Association.

COKE-OVEN GAS AT SHEFFIELD.

Some notes on the introduction and supply of coke-oven gas to Sheffield were submitted by Mr. J. H. W. LAVERICK at a meeting of the Institution of Mining Engineers held at Doncaster last Saturday.

Mr. LAVERICK, who is President of the Institution, vacated the chair in favour of Mr. W. D. LLOYD, of the Altoft Colliery, during the reading of his paper.

The author prefaced his contribution with a few general observations on town gas supply. He referred to the impending legislation to establish a new basis of charging for gas according to the heat units supplied, and gave particulars of the proposal. To a great extent an obstacle in the advance of the use of gas and the ground for dissatisfaction sometimes expressed were due to the fact that houses had been fitted with pipes which, originally ample for lighting, were now too small to serve the additional purpose of gas fires and cookers. He agreed with the view that, in the interests of national health and economy, gas-fires should be generally used in houses—coal fires only being employed in the living rooms. Gas should be installed for cooking purposes; but so far as lighting was concerned, he preferred electricity.

Mr. Laverick then referred to the useful information and data recently supplied by Sir Dugald Clerk, indicating the considerable conservation of coal effected by the use of gas. The extended employment of gas also played an important part in keeping the air of towns pure and in the reduction of fog troubles.

The author said that, through the supply of coke-oven gas to Sheffield, the railways or streets, or both, are relieved of traffic to the extent of from 40,000 to 50,000 tons of coal per annum, the equivalent of from 220 to 275 thousand million British thermal units.

There was during the war a serious shortage of gas in Sheffield; and, as a result of the pressure applied by the Ministry of Munitions, an agreement was eventually come to between the Tinsley Park Colliery Company, Ltd., and the Sheffield Gas Company for the supply of coke-oven gas to their Grimesthorpe works, where it is purified and mixed with the gas made by the Company, and used for power, heating, and lighting.

The coke-oven plant consists of a battery of 55 ovens of the Koppers regenerative type. The agreement with the Gas Company contains the following provisions:

That the minimum quantity should be not less than 5,000,000 c.ft. per week.

The Gas Company undertook to lay a 16-in. cast-iron main from their Grimesthorpe works to the Colliery Company's coke-ovens; also to provide purifiers, a calorimeter for testing the value of the gas after purifying, and a meter for measuring the quantity of gas supplied after purification.

The Colliery Company undertook to supply a gasholder for mixing purposes having a capacity of not less than 100,000 c.ft.; also a booster for forcing the gas through the pipes and purifiers into the holders at the gas-works. The gas must be supplied continuously, and, as far as reasonably practicable, in equal hourly quantities.

The calorific value must be determined from day to day by taking the average of tests per hour and the aggregate average for 24 hours.

In actual practice, after nearly twelve months' working, the results obtained, omitting strike periods, have been:

Average quantity of gas supplied per week . . . 7,263,850 c.ft.
Average calorific value, after the abstraction of benzol . . . . . 509 B.Th.U.
Pressure of supply, 36 in. water-gauge, which is more than sufficient to overcome friction in the pipe-main in the Gas Company's oxide purifiers and in the holders.

As regards the price at which the gas has been sold, the author was not at liberty to divulge the figures; but he said that the price is determined by the calorific value and to an extent by the price at which the gas company sell to the public. The price that should be paid, however, will vary in different localities, according to the net cost of manufacturing gas into the holder by a gas authority. The main was put down by the gas company large enough to carry an increased quantity in the future, if it should be required.

It is highly important that the coke-oven walls should be kept in a good state of repair, in order to maintain the yield of gas per ton of coal carbonized; and therefore the walls are rebuilt systematically by commencing at one end of the battery and taking them in rotation. This has the further advantage of maintaining the output and quality of the bye-products.

The plant at the ovens comprises a self-recording calorimeter, a gasholder, and two boosters, of which one is a stand-by. One of the boosters is fitted with a variable speed-controller from one to ten speeds, and can be worked according to the gas supply. The gas is conveyed a distance of 1¾ to 2 miles.

At Middlesbrough, where only coke-oven gas is used, the price is 2s. net per 1000 c.ft. which is probably, at the present time, the lowest in the United Kingdom. At the outbreak of the war, the price there was 2s. 2d.

The quantity of gas supplied by the Tinsley Park Colliery Company is now at the rate of between 500 and 600 million c.ft. per annum; while the total quantity produced by the Sheffield Gas Company is about 5000 million c.ft. per annum. The coke-oven gas is, therefore, about 10 to 12 p.ct. of the whole; but as the gas is supplied to only one of the three Sheffield gas-works, it is probably 20 to 25 p.ct. of that gas-works' production, which is no

inconsiderable proportion—especially as it is supplied to the east end of the city, where the large works are situated. The proportion of surplus gas sold to that generated in the coke-ovens is roughly 50 p.ct.; but it is hoped to improve on this amount by "steaming."

At the Saltley Gas-Works, Birmingham, producer-gas is used for carbonizing, and the whole of the gas evolved from the coal is distributable. In America, a new coking plant has been put to work recently, where the ovens are fired with producer-gas, so as to release the entire output of the rich gas for other puposes.

DISCUSSION.

The CHAIRMAN, in expressing thanks to Mr. Laverick for a very useful paper, asked whether coke-oven gas was suitable for lighting as well as heating purposes.

Mr. A. THOMPSON (Agent of the Maltby Main Colliery) advanced a series of questions as to the use of cast-iron instead of steel for the supply pipes, whether the gasholder was employed solely for blending purposes, if the naphthalene deposits experienced by Sheffield were in any way due to coke-oven gas, and if appreciable loss was sustained from leakage on the pipe-line. He also asked for information as to the variation in the calorific value of the gas, though he did not think this could be much. He had been told that any gas company taking coke-oven gas would have to maintain their own carbonizing plant in case of unavoidable cessation of the colliery supply. He would like to know if there was any increase in the ammonia yield due to "steaming," and to what extent the calorific value of the gas was reduced in the process.

Mr. R. WATSON (Doncaster), who was invited by the Chairman to take part in the discussion, considered it was in the interests of the nation, the coke-oven industry, and gas undertakings alike, to take advantage of surplus coke-oven gas wherever this was available. Following the author's remarks as to distribution of gas from coke-ovens, he said there was no difficulty in transmitting gas under high pressure through pipes for considerable distances; the matter being rather one of cost. He referred to cases of such distribution in the United States and in Switzerland. There were several important points to be considered in connection with the use of coke-oven gas by town gas undertakings. The supply might be interrupted by colliery accident, strikes, and "days of play;" and unless a continuous service could be maintained throughout the whole year, it would seem imperative that equivalent carbonizing plant and a coal stock be kept ready at the gas-works. Even with these, there was the possible difficulty of finding at short notice suitable men for stoking. The cost of the provision of plant, &c., together with that of the pipe line, had obviously to be borne in mind when settling the price at which the coke-oven gas was purchased. The speaker also alluded to the necessity of a fairly uniform calorific value, and asked whether Mr. Laverick would state the maximum and minimum values of his gas. That there was variation was indicated by the use of a mixing holder. He was interested in the author's suggestion of "steaming." The process, of course, meant the production of water gas; and its addition to the coke-oven gas had the effect of reducing the heat units per unit volume of gas supplied, and thereby lessened the carrying capacity of the pipe-line—a matter which, in the case of any great distance, might be of importance. Personally, he would prefer a good coke-oven gas, and so make his own water gas from coke obtained from the ordinary gas-works carbonizing plant. Oven coke was the primary product. Whether the increased gas and ammonia yield compensated for the loss of coke caused by water-gas production in the ovens was a matter for them to settle.

Mr. SUTCLIFFE (Wakefield) stated that he had been much interested in water-gas possibilities. He had read that one town (Scunthorpe) was making a gas containing 61 p.ct. of this gas, and that the coal gas actually made had very materially reduced the consumption of coal. This was a fact which should be brought home to their men, as showing the trend of events.

Mr. I. ENSOR (Tinsley Park Colliery) considered that, wherever possible, all the gas should be produced at the colliery and distributed to towns. In the case of Sheffield, there were three enormous gas-works; and the gas made could have been manufactured and transmitted from coke-ovens.

Mr. C. E. ELLISON (New Monckton) asked what effect steam had on the brickwork of the ovens. He referred to one case of a small gas undertaking which took its supply from coke-ovens, and had unfortunately experienced some of the difficulties mentioned in the discussion, including leakage from the pipe-line from subsidence, and interrupted gas supply due to stoppage of the coke-oven working.

Mr. LAVERICK, in his reply to the speakers, remarked that coke-oven gas was similar in all respects to ordinary coal gas, and was suitable for town supply. He was so far satisfied that in any additions to coke-oven batteries, he would arrange for the heating to be done by producer gas and liberate the whole of the coke-oven gas for disposal. In reply to Mr. Thompson, he said that the use of cast iron for the Sheffield pipe-line was probably due to the difficulty of getting steel during the war. The coke-oven gas supplied was measured both at Tinsley and at Sheffield; and he did not think there was any leakage. The gasholder was for blending purposes; and it would perhaps have been better to have erected a larger holder. There was, however, no serious variation in the calorific value. There had been no direct complaints on the score of naphthalene; and this could not be greater than in ordinary town's gas. He did not believe that the steaming process had any effect on the brickwork. The steam was introduced during the last six hours of the charge. There was more gas, an increased nitrogen yield, but no perceptible reduction of calorific power. Dealing with other points raised in the discussion, Mr. Laverick said he was glad to have had the support of a gas engineer. In addition to the Swiss example of long-distance transmission, he found, on visiting a German colliery some years back, that they distributed gas to a town some 16 miles away, and with satisfaction. The gas undertaking had, however, kept their own carbonizing plant and coal ready for work in case of necessity. He had with him charts of the calorific values of the Tinsley coke-oven gas, which he felt would satisfy Mr. Watson. [These charts showed maxima of 520 and minima of 440 B.Th.U.; the average being, as stated in the paper, 509 B.Th.U.] With reference to any loss of coke due to steaming, he was inclined to think there was very little, if any. During the recent railway strike, the coke-oven gas had been of great service to Sheffield. Reverting to the effect of steam, he might say, in reply to Mr. Ellison, that the steam was superheated; and there was no deleterious action on the brickwork of the oven. The wet coal charge was more likely to have this effect.

Mr. RILEY, the Manager of the Tinsley Park Coke-Ovens, then gave a few details of the method in which he introduced steam into the ovens. This was somewhat similar to that adopted for the steaming of horizontal retorts.

The thanks of the meeting were expressed to Mr. Laverick for his paper.

COAL CRUSHING IN A BYE-PRODUCT PLANT.

The "Bradford" Breaker.

A Constructional Engineer contributes to the New York "Gas Age" some notes on the possibilities of coke-ovens and the use of crushers. He says that, all things considered, it seems hardly likely the sweeping advance of the bye-product coking industry will be greatly checked by the change from war to peace demands. Never has a new and revolutionary industry faltered so little at the outset. It took forty years in the electrical industry to reach a state approaching stabilized design. On the other hand, except for minor changes, bye-product oven design reached maturity in fifteen years, and so will have had twenty-five years of refinement and development free from radical experiment and change, by the time it is as old as the electricity generator now is. The physical plant used in bye-product work represents the epitome of sound, substantial, and enduring construction.

Taking, for example, the coal-crushing equipment, he describes the "Bradford" breaker, which is usually placed at the top of the crusher-house, in batteries of from one to four, to receive the coal. The machine consists of a large, slowly rotating drum, having a steel frame of "great ruggedness," covered with a shell of perforated plates. The coal enters at one end, and is carried up by longitudinal shelves on the inside of the drum; and as each shelf passes the angle of repose, the coal drops and breaks—the smaller pieces passing the perforations, and the larger ones being caught by the next shelf, and dropped again. The contents of the drum are pushed steadily along by the screw action of rows of heavy steel deflectors bolted to the inside surface of the drum—each one catching its share of the load at an angle, and thrusting it along. By the time the far end of the breaker is reached, there is little left inside but slate, rock, sulphur balls, tramp iron, mine timber, &c.; and this refuse matter is pushed out to the mouth of the shoot by the helical action of large castings which resemble sections of a huge screw thread. The machine moves as a unit structure, and requires comparatively little power delivered through the pinion and gear. From the breaker, the coal is either stored or delivered direct to hammer crushers.

Central House Heating by Gas.

Mr. C. M. Robert lately told the members of the Pacific Coast Gas Association what has been done in Los Angeles in the way of popularizing the gas-furnace for heating dwellings. A few years ago it was practically an impossibility to convince a consumer that he would not become bankrupt if he used a gas-furnace in his house; and Mr. Robert can remember when five or six of these furnaces were sold each season—with the comment that they could not remain on account of the high cost of operation. But as these furnaces were correctly installed, and gave the users good service at a reasonable cost, the next year brought forth increased sales, and the following year still more, until gas-furnaces sold in Los Angeles during the past season were in the proportion of fifty to one of coal-furnaces. The fact is, he said, that it is possible to heat a home as cheaply with a gas-furnace or gas-fired steam-boiler, all things considered, as, for instance, with coal at $12 to $14 per ton—the prevailing price on the Pacific Coast. In Los Angeles, he has found that about 75,000 c.ft. a year will heat the ordinary home of from eight to ten rooms. These figures are the result of a comparison of twenty-five homes of this description; and the average was slightly more than 70,000 c.ft. There are many people who would use a gas-furnace, but do not care to go to the expense of buying a new one; or they may be in a rented house which is equipped with a coal-furnace. In such cases, the Company converted the coal-furnaces into gas-furnaces; but when this is done the salesman must be very careful to explain to the consumer that the cost of operation of a converted furnace will be more than that of a furnace designed for the use of gas—it will average, in fact, about 20 p.ct. more. Gas-fired steam-boilers, too, have proved quite successful.

On Thursday evening of this week, the Midland Junior Gas Association will have a "Paperette Meeting." There will be contributions on "Scientific Instruments on Gas-Works," by Mr. J. H. Gee, B.Sc., A.I.C., and Mr. A. H. Mills.

AMERICAN GAS ASSOCIATION CARBONIZATION COMMITTEE.

Report Submitted to Last Month's Convention.

A review of reports of Committees on Carbonization for previous years shows that their work has generally consisted of cataloguing and describing the installations of carbonizing equipment constructed and put into operation during the twelve months preceding the report. After carefully considering plans for the 1919 Committee, and taking into account the fact that no report has been made since 1916, we have thought it best to present a description of installations made during this interval. In preparing our report on these installations and the results obtained from them, we were much impressed with the desirability of having tests made in accordance with standard specifications, and the results tabulated on standard forms.

In 1916 there was presented to the Association a report of the Committee on Standard Tests, in which methods for making tests were specified in great detail, and forms were given for reporting results. But we have no record that these forms were adopted by the Association. Your Committee believes that the adoption by the Association of standard methods for making and reporting tests would materially assist progress in the art of carbonization.

We have passed through a period of war, and labour conditions have been extremely difficult in both operation and construction. Companies have been compelled to add to their capacity to keep up with their demand; and in selecting installations, they have been governed many times by considerations not always in conformity with the best engineering practice or the best economy. Builders have been greatly handicapped by inability to obtain a satisfactory selection of labour and material; and many expedients have been resorted to. Construction has not always been in accordance with the best practices; and many of the installations made and put into operation have suffered from the lack of intelligent supervision and proper handling. Results have often been impaired, and the life of the installation reduced, by these causes, which must be taken into consideration in passing judgment on any installation.

It is increasingly difficult to maintain a proper operating force; and to minimize the amount of labour required, and to provide interesting and not too irksome employment, many new installations must be made. All new installations will of necessity be measured by this standard more than ever before. The question of whether the installation of costly mechanical devices will pay in the amount of labour saved will be secondary to the question of the ability to maintain service.

The most important and noticeable development of the past few years is the fact that most of the extensions to carbonizing equipment have been coke-ovens or adaptations thereof, or the further improvement of vertical retorts. Many ingenious installations have been made which give the smaller plants the advantages of large charges and long carbonizing periods at approximately the same construction cost as the older types of installations. The coke-oven type of plant seems to lend itself admirably to the use of labour-saving devices in handling coal and coke, and for the saving of labour and making the operator's job more attractive.

It is necessary to state that the results obtained in these installations have not in general been better than those secured in the efficient installations of through retorts with charging and discharging machines, and in the later installations of vertical retorts. It is clearly seen by the operators, however, that, as these plants grow in size, the results obtained will materially improve to a point where older installations cannot compare with them. A description of some adaptations of coke-ovens to smaller plants is given in the reports of the Parker-Russell Mining and Manufacturing Company, the Improved Equipment Company, the Gas Machinery Company, and the Koppers Company. These reports will be found in the appendix.

There is no such thing as one carbonizing process that is best adapted to all localities. One can only be chosen after thorough study of local conditions; and this study should include a consideration of:

(1) The market for coke and other residuals.
(2) The capacity of the plant required and the probable future development.
(3) Transportation facilities.
(4) The conditions surrounding the available site and its proximity to the market and to other industries.
(5) Coal supply available.
(6) Local labour conditions.

Although an increasing number of installations have been coke-ovens, adaptations thereof, and vertical retorts, it is a fact that retort-benches (both horizontal and inclined) still fill the requirements in certain locations; and a large number of installations of this type have been made since 1916. This type of carbonizing equipment is so familiar that no description is here given of the new installations.

Outside of coke-ovens and smaller adaptations thereof, the type which commands most attention is the new vertical retort installation. The Rochester plant, the largest installation of vertical retorts in this country, has been in operation for a year. A description of the plant by the builders will be found in the appendix.

We also present the results of the past year's operations of the Rochester Company. These come fully up to the expectations of the builders; and with the use of the independent producer for heating the benches, the control of the heats obtained is such that long life and excellent results seem assured.

Other vertical retort installations have been made. The vertical retort has always appeared to be specially adapted to the small plant; and a description of such an adaptation is given by the United Gas Improvement Company, the builders.

The largest percentage of all the carbonizing capacity installed since 1916 has been in the form of coke-oven installations. The coke-oven installations are, however, nearly all of large capacity as compared to other types. Conditions brought on by the war made coke-oven construction a national necessity; and this large percentage may not properly indicate the future trend. Many large coke-oven installations have been made where a combination of business opportunities rendered it possible to locate them so as to supply city gas to adjoining cities and towns. Many more such opportunities will be developed in industrial communities; and progress in oven construction and operation becomes more and more the gas man's business. How to make the best use of this comparatively new facility is a problem which should command his best attention. The decline of the prices of bye-products from coke-ovens to a peace-time basis, has halted the feverish activity in coke-oven construction. Much misleading information has been published as to the profits to be derived from the recovery of bye-products. This is to the detriment of legitimate investments in the gas industry.

We are able to present here a list of the coke-oven installations in operation or in course of construction. [This list is not reproduced here. It shows that the number of bye-product coke-ovens in operation in 1917 was 7826; the annual capacity being 35,827,120 tons of coal. The number of bye-product ovens built or building in 1918-19 was 3883; the annual capacity of them being 24,786,715 tons of coal.]

A description of some of the later coke-oven installations will be found in the report by the Koppers Company and the Semet-Solvay Company, in the appendix. It will be found to cover the developments in the use of coals not heretofore considered usable, the developments in the use of producer gas in heating the ovens, and new developments in oven construction.

In the past two years much interesting work has been done on the admission of steam to the retorts during the carbonizing period; and much study has been made of the beneficial results to be obtained by this process. As there is to be a paper before the Association on the subject, it will not be further referred to in the report of the Committee on Carbonization. [Portions of the paper will be found on p. 377 of this issue.]

An experimental bench has been built at the plant of the Springfield Gas Light Company, Springfield (Mass.), in which retorts of the Glover-West vertical bench are made entirely of carborundum material. This bench has been in use nearly a year. It was found, on account of the high conductivity of the carborundum and the thinness of the walls of the retorts, that changes would have to be made in some of the construction. The bench has not been in operation for a sufficient length of time to state whether or not it is a success; but it has been determined that the fuel consumption is much lower than in similar benches of other construction, and that the capacity has been materially increased.

For a number of years there have been installations abroad for the production of gas coke and light oils, by what is usually termed the "low-temperature process." This did not seem of importance to the industry in this country, because of our plentiful supply of cheap anthracite coal, coke, gasoline, and transportation. The war lessened the supply and increased the cost of these important articles; and a considerable number of processes of low-temperature carbonization were projected. Continued high prices may enable these processes to fill a need in our commercial structure. It may not be within the province of the Carbonization Committee of the American Gas Association to investigate this; but as a matter of general interest, it should not be overlooked.

Numerous experimenters are working to develop commercial processes for the distillation of coal at relatively low temperatures. The two main purposes of such experimenters are the conversion of a relatively low-grade, high-volatile coal or lignite, into a high-grade, smokeless, solid fuel, and the production of a combustible liquid distillate which may be converted into a satisfactory fuel for internal combustion engines or into other high-grade products.

In all these processes, the yield of gas suitable for general distribution is low. Hence they give little promise of being of any special importance to the gas industry directly. Possibly one or more of them may be commercialized on a scale large enough to make the gas obtained as a bye-product something of a factor locally. There is also a possibility that, should any of these processes be successfully developed, the solid fuel produced thereby might in some cases prove a suitable fuel for water-gas manufacture.

Unfortunately for the workers in this field, costs of construction and of operation have nearly trebled during the past four years, whereas the prices of the crude tar or oil, and of the refined products made therefrom, are now about the same as before the war. Hence there is less inducement for expenditure in developing such processes than there was a few years ago.

In some cases, the carbonaceous residue is expected to carry from 10 to 18 p.ct. of volatile. This may be burned without producing smoke. Practically all the volatile matter which may be readily liquefied, as well as the combined water, has been expelled. In several processes this partial distillation is effected in retorts through which the pulverized coal is moved with constant agitation. Thus the mass of the coal is heated uniformly to the temperature necessary to secure the desired result without any portion of it being overheated. The residue may then be briquetted. Some investigators are experimenting with such a process under vacuum; others are operating at about atmospheric pressure. There appears some difference of opinion as to the relative value of the tar or oil obtained under these different conditions.

By another process the coal is placed in narrow cast-iron containers, which are passed through a heated oven; the volatile matter being collected and condensed.

So long as the unfavourable conditions noted above continue, the commercial success of any of these processes is dependent upon overcoming very heavy handicaps.

The material which makes up the appendix was submitted in answer to the Committee's request sent to makers of carbonizing equipment. Each Company describes its own installations.

APPENDIX.

THE IMPROVED EQUIPMENT COMPANY.

By F. G. CURFMAN.

In the early part of 1915, the costs of labour and coal started on their upward trend. In the face of this, the average gas company was unable to get any increased rates; and in some cases, the existing rates were reduced by the Commissions in the various States.

The Improved Equipment Company, appreciating the gas companies' position, realized that it was necessary to develop a carbonizing unit which, while using, if possible, the old foundations, retort-houses, and accessories, as far as practicable would tend to overcome these conditions. To effect the necessary economy in holder costs, carbonization in bulk offered the best solution. So a small gas-oven was developed, and the first installation made at the Washtenaw Gas Company, in Ann Arbor (Michigan).

The first unit consisted of nine ovens, which were erected on the foundations on which had stood three standard stop-end three-quarter benches of sixes. The rear wall of the retort-house was removed; and back binders on these ovens were extended to support the roof. The ovens were put into service on Feb. 2, 1917. The results obtained from operation were practically the same in the way of yields of gas, tar, and ammonia as had been obtained on the stop-ends; while the labour cost per 1000 c.ft. of gas was reduced to such an extent that this saving alone netted a large return on the investment. Later, an additional unit of nine ovens was added to the original stack; and the gas produced on these six benches of three ovens each was equivalent to what had originally been produced on ten benches of three-quarter stop-end sixes. These benches have been in continuous operation since they started, and to date have shown no appreciable wear.

The most serious problem to solve was the proper design of the baffle-plates. The original baffles were made of steel angles and steel plates, hinged at the top of the door-frame, and pulled up by a hoist. These soon warped out of shape. After a number of experiments, cast-iron baffles were designed, which are lifted out of the oven by heavy levers attached to the pusher and quenching cars. These have proved very successful.

Another difficulty encountered was the very high temperature on the top of the ovens—especially around the off-take pipes—causing great annoyance by the formation of pitch in the hydraulic mains. This difficulty has been remedied by generous flushing with crude liquor in the hydraulic main; and in some of the larger ovens slight alterations were made which have entirely eliminated the hot space at top.

At the Ann Arbor plant, a Doherty washer-cooler has been installed, the liquor from which supplies the flushing system in the hydraulic and foul mains, after which it is returned to the washer-cooler. This method has proved absolutely satisfactory. No stoppages have occurred since its adoption; and the temperatures of the gas in condensing are absolutely under control.

The battery of six ovens at Ann Arbor has been producing an average output for a period of several months of 660,000 c.ft. of gas per day. These ovens are easily operated by five men to a shift, which handles all work from reclaiming the coal from the bunkers to putting the coke through the screens and into storage—including also the care of the ovens and the stoking of the fires.

The fuel needed in the furnace per ton of coal carbonized varies from 280 to 300 lbs., depending upon the heat required, as demanded for the amount of gas to be produced. Heat control is very flexible, and temperatures can be raised or lowered according to the fluctuating demands for gas. The average monthly reports show a gas yield of 5·3 c.ft. per pound of coal carbonized, with a calorific value of 610 gross B.Th.U.

The ammonia and tar yield is normal. The accumulation of carbon on the sides and top of the ovens has been stopped entirely by the introduction of steam, so that there is no scurfing. The ovens are equipped with the Doherty bench-fuel economizer, which accounts for the low fuel consumption and the convenience and ease of controlling the heats.

At the plant of the Michigan Light Company, at Pontiac, the Improved Equipment Company have installed fifteen ovens, similar in design to those installed at the Ann Arbor plant, except in size. The ovens at Pontiac are 12 ft. 4½ in. over-all in length, 12 in. wide, and 6 ft. high—each unit containing three ovens, heated with an enclosed recuperative type of producer which is equipped with the Doherty bench-fuel economizer. The charges in each of the Pontiac ovens average 2600 to 2800 lbs. The yield of gas averages about 5·5 c.ft. per pound of coal carbonized. The bench fuel is somewhat lower than that obtained at Ann Arbor. The labour cost is very low; but on account of operating the ovens in connection with some retort-benches, accurate distribution of the ovens cannot be obtained.

At the plant of the Michigan Light Company, at Jackson, the Improved Equipment Company have built thirty carbonizing chambers of the horizontal type. Each oven is 22 ft. over-all in length, 12 in. wide, and 6 ft. high. Each oven holds a charge of about 4700 lbs. The ovens are grouped, three to each unit, and heated with an extended recuperative type of gas-producer, which is equipped with the Doherty bench-fuel economizer.

The principal difficulty encountered at Jackson was the overheating of the gas at the top of the oven. This has been eliminated; and the results now obtained compare very favourably with our former installations. The yield is good, and the bench fuel required is quite low. In both the Pontiac and Jackson plants the Doherty washer-cooler has been employed to wash the gas.

The coal is introduced at intervals through the charging-holes in the top of the ovens. After the coal has been coked for a period of from eight to twelve hours, depending upon the capacity desired, the oven-doors are opened, and the baffles removed. These baffles are heavy cast-iron angle plates, which are inserted in each end of the oven for the purpose of keeping the coal in a hot-temperature zone, thus insuring a uniform quality of coke.

The ovens and the setting-blocks supporting them are all constructed of silica materials.

The main advantages of this type of carbonizing unit are: Low first cost; low labour cost; low fuel cost; simplicity of design and ruggedness of construction; simplicity of operation and distribution of heat; and superior coke.

Our experience shows that the yields of gas, tar, and ammonia produced on these oven installations are approximately the same as those obtained on the modern type of through retort-benches; and due to the simplicity of operation, the troubles from labour are almost eliminated, as no skill in the handling of this equipment is required, and any ordinary labourer can be broken in and instructed in the operation in a very short time. The auxiliary coal and coke handling machinery is of standard design and simple construction.

THE PARKER-RUSSELL MINING AND MANUFACTURING COMPANY.

By LEIGH WICKHAM.

Since the last report of the Carbonization Committee to the gas companies in 1916, one improvement of great value is a new type of carbonizing unit—*i.e.*, the gas-ovens which are designed and built for carbonization in bulk. There have been built a number of horizontal gas-ovens, as well as inclined gas-ovens, each of which has its merits. The horizontal type of oven has given unusual satisfaction—the principal advantage being the saving in amount of labour; while the class of labour required need not be so skilled, and is easier to secure. We built a gas-oven installation of 125 tons capacity at Kalamazoo in 1918; and it is being operated on 1·04 hours of labour per ton. If the capacity were doubled, for example, the labour needed per ton would be considerably reduced.

The principal improvement in the ovens consists of maintaining a cool zone at the top, through which the gas passes on its way out. The tops of the ovens are made of blocks of special material, which are thicker than those forming the oven-walls; and this, together with the fact that the heating flues are kept below the top of the ovens, prevents the gas-space over the charge from becoming overheated, and the gas passes off without breaking-up. The primary and secondary air are introduced under forced draught, which ensures a constant supply. The quantity of both primary and secondary air is measured before it enters the recuperators. The secondary air entering the recuperators is controlled by dampers, which permit the regulation of the supply to any part of the combustion chamber.

The ovens are heated by a system of vertical flues. The producer gas and secondary air are brought together to give complete combustion at the lower end of these flues; and the products of combustion are carried up through them to a horizontal collecting flue extending the entire length of the oven. Three of the vertical flues at one end are used to carry the waste gases down to the recuperators. At the top of each vertical flue there are dampers, by which the heats can be regulated and distributed evenly throughout the length of the oven.

The oven doors are of the self-sealing design, which was considered by many well-informed coke-oven designers and operators an impossible accomplishment; but they have proved entirely satisfactory and successful. The self-sealing doors are considered a convenience in many ways, as they do away with the nuisance of luting the doors each time they are opened, and make it possible to keep floors clean. There is also a saving of time in taking off and putting back the doors.

The charges are placed in the ovens in the usual way—that is, from a coal filling wagon with three spouts, running on top of the ovens. After the ovens are filled, the charges are levelled-off by a coal-leveller mounted on the pushing machine. The pusher is of the usual type, similar in all respects to those used in coke-oven practice.

The generators are located on the pusher side, and have ample grate surface to heat the ovens on about 275 lbs. of dry coke per ton of coal carbonized. The yield per ton when a good grade of gas coal is used is about 5·3 c.ft. per pound; and the ammonia yield is over 5 lbs. per ton of coal carbonized. About 14 gallons of an extremely high quality of tar are recovered per ton of coal carbonized.

We designed and built a plant at Rome (New York), consisting of the coal and coke handling machinery and five benches of inclined sixes, with a capacity of 10 tons per bench in twenty-four hours. The retorts were 16 in. by 26 in. cross section, and 16 ft. 10 in. long, made of silica sections and supported by silica settings. The benches were equipped with the Congdon scrubber standpipe system; and so far, no stopped standpipes have occurred. The coal is fed into the retorts by a single lorry, which contains three spouts for the varying levels of retorts. The principal advantage of this lorry is that it saves space and time in filling the retorts. As the tracks on which it travels are elevated well above the benches, the coal shoots out of the spouts with

such force that the retorts can be filled full and evenly. A charge of 1000 lbs. can be placed in them, and burned-off in six hours.

THE GAS MACHINERY COMPANY.

By W. E. STEINWEDELL

This Company have built more capacity in bye-product gas-ovens than in any other type. We have made such installations in the following plants:

Linton (Indiana)	3 ovens
Battle Creek (Michigan)	18 ovens
Flint (Michigan)	48 ovens
Evansville (Indiana)	24 ovens
Waterbury (Conn.)	27 ovens
Memphis (Tenn.)	27 ovens

The object aimed at is bye-product gas-ovens in which all the gas is recovered, and which are provided with generators and recuperators, are heated by part of the coke made or by coal, and have become a standard means used by gas companies for carbonizing coal in considerable quantities.

As the best grades of gas coal are not always available, and are becoming more difficult to obtain, it is frequently necessary for gas companies to use grades which will not produce satisfactory coke if distilled in retorts.

Gas companies are installing gas-ovens on account of the improvement in operating results, reduction in quantity of labour, and simplification of the work over retort processes.

All the gas is recovered in gas-ovens; whereas about one-half the gas is used to heat bye-product coke-ovens; and the initial investment in gas-ovens for a given quantity of available gas production is therefore only about one-half the initial investment in coke-ovens for the same production of available gas.

Design.—Bye-product gas-oven plants are furnished with either inclined or horizontal ovens. The inclined ovens require less ground space, and it is unnecessary to level the coal after it is charged into them. Gas-ovens are adaptable to almost any size of gas plant, and are built in 4000 lbs. capacity per oven, upwards.

The ovens are built in units of three, which are heated by a producer of the extended type, provided with a centrally located charging door, thus permitting the fuel to be charged by gravity from a fuel-car which runs on an industrial track. A blower operated by superheated steam, supplies primary air to the producer, prevents the formation of excessive clinker, and ensures a uniform production of producer gas. Full-depth recuperators are provided; and the weight of the setting does not rest directly on the recuperators, but is carried on the dividing-walls between them.

The combustion chambers are of maximum size, and constructed on the same principle as the heating chamber of a bench. This provides a slow movement of the heating gases through the combustion chambers, as well as efficient combustion.

The combustion chambers are thoroughly accessible, without having a large number of holes through the top of the setting. These holes tend to increase the heat in the top of the ovens, and thereby overheat and break-up the rich gases which are being generated from the coal.

Each combustion chamber has its own recuperator, entirely independent from any other. and with readily regulated air-supply and waste-gas dampers. The furnace castings and oven mountings are of special design, and have proved their efficiency in actual practice.

The scrubber standpipe system is used to saturate the gas with moisture and prevent stoppages; and the liquor circulating system is provided with a tar displacement tank to ensure clean liquor for circulation and prevent stoppages of the liquor piping.

A roof covering, stairways, and platforms are provided for convenient operation. Coal and coke machinery is furnished to accord with the size of the installation and the local conditions.

Bye-product apparatus to recover the tar and ammonia, and to eliminate the impurities from the gas, is furnished complete. The ammonia can be recovered as crude concentrated liquor, sulphate of ammonia, or as aqua ammonia.

Gas-ovens have the following advantages over retorts:

(1) The gas is of better quality, as it is not exposed to excessive superheating.
(2) Inferior coal, which is not suitable for making good coke when carbonized in retorts, may be used in either inclined or horizontal ovens to produce a satisfactory quality of gas and coke.
(3) The coke is harder and more uniform in shape, and may be used for metallurgical purposes. The coke is of the best quality, density, and hardness, contains little breeze, is suitable for domestic use, and is more easily sold—especially where bye-product coke-oven coke is sold in competition—and commands a better price than retort coke.
(4) A minimum of labour is required; and the work is not as hard as for other carbonizing processes.
(5) The first cost for a given gas capacity is less.
(6) The maintenance and repairs are less, due to there being no complicated or excessive amount of machinery.
(7) The ammonia yield is greater.

THE ISBELL-PORTER COMPANY.

By J. S. DE HART, JUN.

The only work which this Company have done has been the improved adaptation of Woodall-Duckham continuous vertical retorts to meet conditions for the carbonization of American coals.

The original English design consisted of a deep rectangular producer set between the retorts, and built with the old-fashioned step-grate, which has proved perfectly satisfactory for the coke from English and European coals. We have had a great deal of trouble with this type of producer, on account of the formation of clinker and the difficulty of removing it.

In our new design, the producers are arranged in front of the settings, readily accessible for barring-down from the top, and have about 50 p.ct. increased capacity.

We have also re-designed the retorts to substitute silica material for clay, and to provide a little better arrangement of the secondary air to distribute the heat over the entire length of the retort.

THE UNITED GAS IMPROVEMENT COMPANY.

By J. H. TAUSSIG.

Our early experiences at Manchester, Northern Liberties, Hartford, and Fall River were of such a nature that we were able to eliminate many of the smaller troubles that we had with vertical retort plants when we started the design of our newer types.

The two latest installations of our plants are Rochester (N.Y.) and Fond du Lac (Wis.). The former has a daily capacity of 4,000,000 to 5,000,000 c.ft., and is heated with a detached producer plant. The latter is a very small plant of 400,000 to 500,000 c.ft. daily capacity, and is heated with producers attached to the setting.

Probably the greatest improvement, other than the adoption of silica as a refractory, is the character of the producers in both these plants.

Rochester Producers.—At Rochester, we designed and built five high-pressure producers, equipped with mechanical cleaning and rotary charging apparatus. They were designed to handle small fuels—such as coke breeze and small anthracite coal—and are able to gasify from 20 to 25 tons per day of small coke and breeze, with practically no manual cleaning.

They can be operated with a CO_2 content and the gas varying anywhere from 3 to 10 p.ct. at the will of the operator. The flame-temperatures of the producer gas made, when burned in the settings, are controlled by the quantity of CO_2 in the gas, which, in turn, is regulated by the amount of steam used in the producer.

The ability to operate 21 benches with the same gas, whose heat value can be controlled at the source (and this heat value is of such constancy that there is practically no variation from day to day), gives a remarkable, simple, and easy control to the plant, and relieves the operator of much of the troubles that are common to coal-gas settings having a producer attached to each bench.

The gas entering the settings is also rid of practically all its dust; and the life of the settings is thereby lengthened, and the flues are kept clean.

One of the first objections that would come to one's mind in considering this system, would be the loss of heat due to conducting hot gases over such great distances as are necessary to distribute them to the various benches. By thoroughly insulating the flues, this loss of heat is almost negligible.

Heat Control.—In conjunction with the ability to get gas of constant heat value and constant sensible heat for fuel, measurement-devices were that enabled the operator to regulate the quantities of materials at each bench at will—of both the hot producer gas and the air for secondary combustion.

Although means were provided that would take care of distribution in the settings, the design has been perfected to such an extent that these devices are not necessary, and the distribution of heat is taken care of automatically by the design and proper internal size of the flues, There are also only two burners, or two points where combustion takes place in the sesting, in each bench; and these require no internal control. Thus the skill in regulating the distribution in each setting is entirely eliminated; and if the proper amount of gas and air, as measured in the meters attached to each setting, is supplied, the settings require no further control. In addition to the measuring device at each bench, there is a central control station at which pipes leading to the outlet of each setting are connected to a central gas analyzing apparatus. At this point, gas from any bench can be drawn and analyzed. There is also a pyrometer connected to the outlet of each setting, by which the temperature can be read at one point.

Bench Accessories.—Considerable improvement has been made in the design of the top and bottom mouthpiece castings; and such a thing as a stopped take-off pipe is not known. The usual hard labour in cleaning these pipes is also eliminated. In order to reduce any liability of pitch trouble, sprays have been inserted in the dip-pipes of the hydraulic mains; and these reduce pitch trouble to a minimum.

Recuperators.—A specially designed recuperator having minimum joints, which are very carefully fitted and cemented together to part of the setting, is also used.

Heat Insulations.—The entire settings are insulated with material varying in thickness from 2½ to 4½ in., thereby reducing to a minimum the heat loss through radiation.

Lorry.—Considerable attention has been paid to the requirements of the lorry for charging coal entering the retorts. This lorry is motor driven. It contains a weighing hopper. The coal is weighed by an automatic punch scale before each charge. The lorry has, as part of its equipment, a device for automatically closing the lids after the charge is dropped into the retorts, thus reducing to a minimum the amount of smoke that leaves the retorts on charging. Each bench has its own hydraulic main and individual take-off pipe, with an individual automatic tar overflow, and a valve for controlling the seal of the main. This equipment is of great advantage where it is necessary to get uniform B.Th.U. or candle power values in the gas.

The plants are also equipped with governors for controlling the pressure at the hydralic mains, and a safety-seal which is regulated to blow-off in case the exhauster stops. Both top and bottom mouthpiece castings have been improved upon earlier designs.

For each stack of seven benches, a waste-heat boiler is provided, which makes practically all the steam required for the plant. The thermal efficiency of a U.G.I. vertical retort plant, with the addition of waste-heat boilers, is very high.

Attached Producer Type.—The other type of plant, as recently built for Fond du Lac (Wis.), has some features in addition to those mentioned for the Rochester plant. The attached producers are of such a design as to eliminate the necessity for clinkering the fires, and require the minimum amount of hand labour. They also give a good quantity of producer gas, practically free from dust.

The producers are equipped with large storage space above the fire zone, so that they can be filled at comparatively infrequent intervals. They are well adapted for small plants, where minimum labour is available for operation. They are also so desiged that they can handle the small amount of breeze made by the plant, which results in a great saving of the coke, as all that will be for sale will be lump, and of saleable size.

The Hartford (Conn.) and Fall River (Mass.) plants have been brought up to date by refilling the benches with silica material. The result has been to increase the capacity of these plants by 33 p.ct.

Size of Units.—The U.G.I. vertical retort plants are now designed to make as low as 7000 c.ft. an hour. These small installations have retorts and ironwork similar to the larger plants.

THE SEMET-SOLVAY COMPANY.

By H. M. CHAPMAN.

The first plant built for furnishing gas for city consumption started the delivery of gas in 1902. Since that time additional plants have been added, until in 1918 there were eight Semet-Solvay plants delivering gas to cities, and in 1919 this has been further increased to ten plants. The total gas delivered by these plants during the year 1918 amounted to 14,911,747,000 c.ft. This undoubtedly represents a very large proportion of the total bye-product coke-oven gas delivered to the consumers.

Supplying gas from ovens where no gas separation had been contemplated has been tried, and works-out very successfully. Using high-grade coals, one of the plants during a year's time sent gas to the consumer averaging 600 B.Th.U. This makes a very flexible operation, and meets some very exacting conditions.

For some time it was the general impression that a good grade of furnace coke, or even foundry coke, could not be produced by the use of straight high-volatile coal. This difficulty was overcome; and by the proper blending of two or more high volatile coals, it has been possible to produce a metallurgical coke which meets very exacting requirements. While this, in a way, has nothing to do with gas manufacture, yet on the other hand it is important, as it enables the higher grade coal to be used in the ovens, which in turn gives a better quality of gas for city distribution. I might also add that, on the plants where there is no gas separation, the ovens may be heated with producer or with blue water gas, and in this way increase the amount of gas that particular plants send to the city. This naturally increases considerably the cost of the gas delivered for consumption; and the financial success depends, of course, on local conditions.

THE KOPPERS COMPANY.

By C. J. RAMSBURG.

The year 1918 witnessed the tenth anniversary of the commencement of operation of Koppers ovens in America. The first battery of seventy ovens, constituting part of the 280-oven bye-product coke plant of the Illinois Steel Company, was put into operation in the fall of 1908, and has been in continuous working ever since. The ovens are in splendid condition, and no repairs have ever been made on the brickwork, with the exception of occasional replacements of jamb bricks, which are minor incidents of regular operation. The performance of this unit is a striking example of the durability of the Koppers type of oven.

Among the developments since 1916 of special interest to the gas industry may be mentioned:

(1) The increased demand for the cross-regenerative combination oven.
(2) The application of producer gas to oven heating.
(3) The increase in variety of coals carbonized in bye-product ovens.
(4) The development of the triangular flue type of bye-product coke and gas ovens.

During the war there was intense activity in the construction of Koppers bye-product coke-ovens. There are now in operation, or approaching completion, in the United States, about 6000 Koppers ovens, with a capacity to coke over 39,000,000 tons of coal a year. The capacity of bye-product ovens of all types was about 9,500,000 tons in 1908, and at the close of 1915 about 24,000,000 tons coal per annum.

Of special interest in this report are the plants of Koppers ovens selling all their surplus gas for domestic purposes. These have been installed as follows:

	Number and Style of Ovens.
Laclede Gas Light Co., St. Louis, (Miss.)	55 combination ovens
Seaboard Bye-Product Coke Co., Jersey City (N. J.)	55 coke-ovens 110 combination ovens
Minnesota Bye-Product Coke Co. St. Paul (Minn.)	60 regular combination and 5 triangular flue combination ovens
Indiana Coke and Gas Co., Terre Haute (Ind.)	30 coke-ovens
Providence Gas Company, Providence (R.I.)	40 combination ovens

A plant of fifty Koppers cross-regenerative coke-ovens is in course of construction for the Birmingham Coke and Bye-Product Company, and will supply gas to the City of Birmingham (Alabama).

Bye-product coke-plants installed for the following companies since 1916 are also distributing part or all of their surplus gas for domestic purposes:

Bethlehem Steel Company, Sparrows Point (Md.)	360 ovens.
Toledo Furnace Company, Toledo (Ohio)	94 ,,
Bethlehem Steel Company, Steelton (Pa.)	360 ,,

The five plants listed above as being built to sell all their surplus gas for domestic purposes have an aggregate capacity to carbonize 6585 tons of coal per day; and if operated as straight coke-ovens using part of their gas for heating the ovens, they will produce approximately 40,000,000 c.ft. of surplus gas per day. All except one battery of 55 ovens of the Seaboard Bye-Product Coke Company, and 30 ovens of Indiana Coke and Gas Company, are equipped to be operated with producer gas as the demand for domestic gas increases.

USE OF PRODUCER GAS FOR HEATING OVENS OF THE PROVIDENCE GAS COMPANY.

The first bye-product coke plant in America to use producer gas regularly for oven heating was the plant built by the Koppers Company for the Providence Gas Company, Providence (R.I.). The plant has 40 cross-regenerative combination ovens, each oven having a net capacity of 11·4 tons of coal. The ovens taper from 18⅛ in. in width on the discharge end to 15¾ in. wide on the pusher end, and are 9 ft. 10 in. high and 37 ft. 10 in. long. The distance from centre to centre is 3 ft. 6¼ in. Part or all of the ovens may be operated with producer gas, as the demand for domestic gas varies. At present 20 ovens are being heated with producer gas made from coke breeze, and the other 20 are being heated with coke-oven gas. The system is thus very flexible, both in respect to heating and to gas production. The experience of six months' continuous operation has shown that the uniformity of heating, and convenience of operation, are in no wise disturbed by the simultaneous use of such different types of fuel gas. The regulation of temperature conditions with producer gas is accomplished with even greater ease than when using coke-oven gas. The efficiency of combustion and regeneration is very high.

The use of producer gas for oven heating is assuming increased importance. In addition to the obvious advantages incidental to its production from cheap grades of fuel—such as coke breeze or high ash coal—its utilization presents a number of special advantages peculiar to bye-product coke oven operation. Practically no attention need be given to the fuel gas pipes, flues, and nozzles. No carbon deposits are formed. Flue temperatures are remarkably uniform. The reversing system installed at the Providence gas plant utilizes most ingenious mechanism which is simple and accessible, and operates with a very high degree of precision.

The plant has been operating regularly on 20 hours coking time; but ten of the ovens have been operated on producer gas for two weeks continuously at 14 hours coking time and for four weeks at 14½ hours coking time, with highly satisfactory results as regards quality of gas, coke, bye-products, and efficiency of heating. The 14 hours coking time corresponds to an average rate of carbonization of 1 in. oven width in 49 minutes—a remarkably fast performance. Analyses of the products of combustion showed 17 to 18 p.ct. of carbon dioxide, with about 1 p.ct. of oxygen, and practically no CO. The temperature of the stack gas was about 350° C.

COKING OF ILLINOIS COAL AT THE PLANT OF THE MINNESOTA BYE-PRODUCT COKE COMPANY.

Of great importance to the bye-product coking industry in its affiliation with the gas industry is the rapid application of bye-product coking to new grades of coal. Various grades of Illinois coal were coked in Koppers ovens very soon after this type of oven was introduced into this country. For instance, half-a-million tons were so coked in 1914. But it has not been until recently that market conditions have been such as to create a distinct demand for the building of plants intended to use such coals regularly. In the fall of 1918, the United States Bureau of Standards made a test of one week's duration at the plant of the Minnesota Bye-Product Coke Company, which, during this period, was operated entirely on coal from Franklin County (Ill.). A quantity of the coke produced was shipped to the blast-furnace plant of the Mississippi Valley Iron Company, St. Louis (Miss.), where it was used for a period of ten days. Highly successful results were obtained, and the furnace operators even expressed a preference for the Illinois coke over other grades to which they had been accustomed.

The plant of the Minnesota Bye-Product Coke Company is arranged to supply the domestic coke market rather than to make maximum yields of metallurgical coke. Undoubtedly, with different arrangements for coke screening, larger yields of furnace coke would have been obtained. The average production was approximately as follows:

Dry furnace coke	56 p.ct. of coal
Dry domestic coke	11 ,,
Breeze	4 ,,
Total	71 p.ct. of coal.

The Minnesota Bye-Product Coke plant has 65 cross-regenerative combination ovens, five of which, in a separate battery, are of the triangular-flue type. The ovens taper from 19½ to 17 in., are 9 ft. 10 in. high by 37 ft. long, and have each a capacity of 12¼ net tons of coal. The plant began operation in January, 1918, and since then has been the regular source of the entire domestic gas supply of the City of St. Paul. The coal regularly used is a mixture of Elkhorn and Pittsburgh coals in equal proportions, with about 15 p.ct. of Pocahontas coal.

COKING OF INDIANA COAL AT THE PLANT OF THE INDIANA COKE AND GAS COMPANY—TERRE HAUTE.

These newest ovens of the Indiana Coke and Gas Company are about 24 in. higher than any Koppers oven previously built. The ovens are 11 ft. 9½ in. high, 39 ft. 1⅛ in. long, and taper from 17 in. to 15 in. They are 3 ft. 5½ in. centre to centre, and have a capacity of 12½ net tons of coal each. The increase of 2 ft. in the height of the ovens, thereby giving additional capacity, has been accomplished with perfectly satisfactory results. The plant has been operated continuously for a period of three weeks at 15 hours coking time.

The coke from the Terre Haute plant is sold almost entirely for domestic purposes. The rapidly increasing use of bye-product coke from gas-oven plants for domestic purposes deserves more than the passing mention that can be given to it in this report. Important developments have occurred in the direction of controlling the quality of coke to meet a given demand, and the developments are proving to be as valuable in the non-metallurgical field as in the metallurgical.

THE TRIANGULAR-FLUE OVEN.

Of special interest is the development, by the Koppers Company, of a new type of flue arrangement and construction, which we may call triangular flued, because the vertical flues are substantially triangular in shape. This type may be a bye-product coke oven heated with coke-oven gas, a gas-oven heated with producer gas, or a combination oven which may be heated with either kind of gas.

At the base of each vertical flue is an air-port communicating with the regenerator, and a gas-nozzle communicating with the usual fuel gas-flue; and the cross-regenerators are as in the ordinary Koppers oven. In each wall there are two series of flues, one facing toward the oven on the right hand, and the other toward the oven on the left hand. Corresponding to these two sets of flues there are two horizontal flues on top of the vertical flues, each pair of horizontal flues corresponding in position with the single horizontal flue in the well-known Koppers oven. Thus each side of the flue-wall has its own heating system; and this is accomplished without making the total width of the flue-wall any greater than in the usual rectangular flue type. This has never been achieved in any previous type of oven. The operations of reversing the gas combustion are performed exactly the same as in the case of a regular Koppers oven.

This type of oven has important advantages. The oven-wall is obviously stronger and tighter mechanically than is the wall containing rectangular flues. The flue heating surface per oven-wall is greatly increased. There are more flues, and therefore additional points of regulation. Thus fine adjustment of temperature conditions is possible. Since each face of an oven-wall has its own heating system, it follows that the temperature conditions are less affected by pushing or charging an adjoining oven than is the case with rectangular flue construction. This condition also gives greater flexibility of adjustment.

A battery of five triangular flue ovens built as combination ovens to use either coke oven or producer gas, was erected as an independent battery at the plant of the Minnesota Bye-Product Coke Company. The battery was put into operation in the summer of 1918, and has been entirely successful and satisfactory from the start. This five-oven unit has a producing capacity of over 1,000,000 c.ft. of gas per day. The operation of these ovens required no special attention other than that given to the regular Koppers ovens. A battery of 60 of the triangular-flue type ovens is now being built as part of the bye-product coke plant of 300 Koppers ovens for the Jones and Laughlin Steel Company, Pittsburgh (Pa.).

PROGRESS IN "STEAMING" RETORTS.

American Views on the Process.

One of the papers submitted at last month's meeting of the American Gas Association was by Mr. L. J. WILLIEN, JUN., of Boston, who gave an account in considerable detail of the progress made up to the present time in the steaming of all types of retorts. The greater portion of the experiences detailed are in connection with work done on this side; but the author includes the following statement as to what has been so far accomplished in the United States.

STEAMING IN AMERICA.

There has been little work done in America with the steaming process. Steaming has not been used more extensively because of legal restrictions on the quality of the gas, which are such that steaming is out of the question. In many places candle-power restrictions are still in force. Even where the calorific standard is in force, the calorific value required is so high that the gas companies in many instances have trouble in meeting it. Any standard above 600 B.Th.U. will not permit of steaming; neither will a candle-power standard permit it.

As far as it was possible to determine, there are about twelve gas plants in America that have made attempts at steaming. They are made up as follows:

Intermittent verticals	2
Inclined retorts	1
Horizontal retorts	3
Glover-West continuous verticals	3
Woodall-Duckham continuous verticals	3

Data were obtained from only six of these plants. One plant operating the Glover-West system gave it up as being of no value. One plant operating through horizontals experimented a little by steaming one bench. While it was impossible to determine whether there was any increase in the amount of gas made, there was an appreciable decrease in the amount of carbon deposited on the sides of the retorts, as well as considerable improvement in the stoppages in the stand-pipes.

SPRINGFIELD TESTS.

In March, 1917, some special tests were made on steaming the Glover-West vertical retorts at the Springfield Gas-Light Company's works, Springfield (Mass.), in connection with an investigation by the Massachusetts Board of Gas and Electric Light Commissioners relative to the adoption of a calorific standard for gas. One unit consisting of 24 retorts on the Glover-West continuous system was equipped with steam connections, and operated for a week without steaming and for a week with steaming. The coal used throughout the test was of uniform grade. The results obtained in this test are given in Table I.

TABLE I.—*Results of Steaming Tests Made on Glover-West Continuous Verticals.*

—	Seven Days' Period Without Steaming.	Seven Days' Period with Steaming.	Per Cent. Gain.
Yield of gas, c.ft. per ton	12,300	15,050	22·4
B.Th.U.	540	519	− 3·8
Candle power	9·5	7·0	−26·3
Gas Analysis:			
Carbon dioxide	1·23	1·69	
Ethylene	1·07	1·65	
Benzene	·97	·95	
Oxygen	·00	·00	
Carbon monoxide	7·92	11·16	
Methane	27·33	24·67	
Hydrogen	57·69	56·18	
Nitrogen	3·80	3·70	
Coke Analysis:			
Moisture	·12	·22	
Volatile	3·94	3·45	
Fixed carbon	81·75	80·97	
Ash	14·19	15·36	

The gas analyses were made by Mr. C. D. Jenkins, the Chief Inspector for the Massachusetts Gas Commission. It was impossible to separate the tar and ammonia liquor from that made with the inclined retorts. Tests made on the gas leaving the retorts showed an increase of 12 p.ct. due to steaming. The average number of retorts out per day was 43·7 p.ct. less with the steam than without.

While the steaming was continued after the termination of the tests, the results obtained did not continue as good as the tests showed. This was due to the mixture of different grades of coal that were used. A uniform grade of coal is essential for the most efficient operation of all continuous vertical retorts, for the reason that for any given grade of coal there is a certain ratio between the heats carried and the rate of travel of the coal through the retorts, which must be maintained in order to obtain the best results. There are some grades of coal in America which it seems impossible to carbonize with the continuous systems. As Springfield was forced to use about ten different grades of coal, it was impossible to obtain efficient results.

In April, 1919, an eight-day test was made on a special grade of coal, during which steam was used. A yield of 15,000 c.ft. of 547 B.Th.U. gas was obtained. During the balance of April, only one other grade of coal was used, or for the whole month only two different grades were used, there being no mixtures; and the yield for the entire month was found to average 15,300 c.ft. per ton, of 538 B.Th.U. gas.

THE PORTLAND GAS LIGHT COMPANY.

The Gas Company at Portland (Maine) submitted some figures obtained with steaming Glover-West continuous retorts. These figures which show that the Company met with considerable success, are given in Table II.

TABLE II.

The Portland Gas Light Company have four benches, of eight retorts each, of Glover-West continuous vertical retorts. They have been using steam for some time; and the averages of the results obtained with and without steam are:

With Fairmont Coal.	With Steaming.	Without Steaming.
Yield per pound	5·84 c.ft.	5·10 c.ft.
B.Th.U.	536	541
B.Th.U. per pound	3,129	2,759
Make per retort	39,000 c.ft.	36,000 c.ft.
Make per man	156,192 c.ft.	142,398 c.ft.

The steam is connected through the casting just above the worm extracting the coke, at 15 lbs. pressure. The make could be increased slightly with more steam; but inasmuch as just at present all the make is coal gas, the 15 lbs. pressure furnishes the necessary B.Th.U. The steam does not affect the coke, and lengthens the time between scurfing periods. Also the carbon is removed more easily while using steam than without steam. They are able to make at the rate of 1,200,000 c.ft. for 24 hours with steam using only thirty retorts; while without steam they make 1,100,000 c.ft.—showing an increase of make of 100,000 c.ft. with steam.

ROCHESTER GAS COMPANY.

Table III. contains some data on steaming United Gas Improvement intermittent verticals at Rochester (New York), which show that no benefit whatever was obtained by steaming.

TABLE III.—*Results of Steaming United Gas Improvement Intermittent Vertical Retorts.*

—	Three Months Period without Steam.	Four Months Period with Steam.
Yield cubic feet per ton (2000 lbs.)	10,819	10,806
Ammonia, lbs. per ton	5·96	5·92
Tar, gallons	13·19	12·02
Coke, per cent.	69·9	72·1
Light oils, gallons	·33	·23
Hydrogen sulphide in gas, grains per 100 c.ft.	450	439
B.Th.U.	576	576

Steam was supplied to the bottom of the retorts at 35 lbs. pressure for a period of 1 hour 35 min., at the end of a carbonizing period of 11 hours 15 min.

PAWTUCKET GAS COMPANY.

The Pawtucket Gas Company at Pawtucket (R.I.) conducted some steaming tests on an installation of Glover-West retorts. While the results were not positive, the Company obtained an increase of about 9 p.ct. in the gas production, and were only able to account for 30 p.ct. of the steam used as going into the additional gas made. The results indicated that the cost of the steam used exceeded the benefits derived.

HOLYOKE GAS COMPANY.

About two years ago, the Gas Company at Holyoke (Mass.) experimented for about one month by steaming two benches of eight retorts of the Woodall-Duckham continuous type, but were obliged to discontinue the experiment because of tearing-out the benches.

They were unable to determine whether any increased gas was made, as the gas from these retorts was not measured separately. The experiment was not considered successful, on account of the excessive drippings, due to the steam not being superheated, and to faulty heats at the bottom of the retorts, which the Company were unable to correct at the time. They report, however, that they intend to resume steaming very soon on all retorts.

MOHAWK GAS COMPANY.

The Mohawk Gas Company at Schenectady (New York) report that they have been steaming Woodall-Duckham continuous verticals for some time, and estimate that they produce some 12 to 15 p.ct. of blue gas. The tar production seems increased; while the B.Th.U. of the gas is reduced about 5 p.ct.

BYE-PRODUCT COKE-OVENS AND THE GAS INDUSTRY.

The place of the bye-product coke-oven in the gas industry formed the subject of a paper which was contributed by Mr. A. H. Harris, Jun., of Joliet, to the proceedings at the recent meeting of the American Gas Association.

The author said that in 1913 the production of bye-product coke was 12,714,000 tons, or 27½ p.ct. of the total coke made in that year. But 1914 saw a general slump in all manufacturing throughout the country, and the bye-product coke production fell to 11,219,943 tons. It is here, however, that statistics first show the preference of blast-furnace men for bye-product coke, as the beehive production took a slump of over 10,000,000 tons during the same period, and the proportion of bye-product coke increased to 33⅓ p.ct. of the total. Under the influence of the European war, American business commenced to pick-up, and with it the production of bye-product coke. Over 14,000,000 tons were produced in 1915, 19,000,000 tons in 1916, 22,000,000 tons in 1917, and 27,000,000 tons in 1918—the latter approximately 45 p.ct. of the total coke produced in the United States for that year. During the depression in the early part of 1919, bye-product coke production, for the first time in the history of the industry, surpassed that of beehive coke, again illustrating very forcefully that, where there is a surplus of coke, the blast-furnace operator will take bye-product coke if it is possible for him to get it.

EFFECT OF THE ENORMOUS INCREASE ON THE GAS BUSINESS.

This remarkable increase cannot but have a tremendous bearing upon the gas business, carrying on, as it does, on a very much larger scale, the self-same reactions that take place in the numerous horizontal and vertical retorts of the gas plants. It is true that the gas from the majority of the ovens throughout the country finds its way into the open hearths, soaking pits, and similar furnaces in the steel mills; but the other bye-products—tar, sulphate, and light oils—form volumes so great that the gas engineer is beginning to look at them with bulging eyes, and to wonder what he is going to do about it.

On Jan. 1, 1919, there were 9940 bye-product coke-ovens in operation in the United States, with an annual coal capacity of 50,024,000 tons, and a coke producing capacity of 36,840,200 tons. Under construction at that time were 1620 additional ovens, which will probably be in operation before the close of the year. This will increase the coal consumption to over 60,000,000 tons, and the coke production to about 44,000,000 tons yearly. These figures are based upon the rated capacity of the various plants, and it is very probable that the consumption will not be fully realized. However, during the year there should be produced approximately 420,000,000 gallons of tar, 60,000 tons of ammonium sulphate (or its equivalent), and 180,000,000 gallons of light oil—practically running away with the bye-product production which, up to the past few years, the gas man considered all his own.

These are truly stupendous figures; and the gas engineer—and, indeed, the other gas company officials—will find it is to their advantage to analyze them very closely, investigate the various markets, uses, and advantages of sulphate of ammonia as a fertilizer, of tar as a source of dyestuffs, medicines, preservatives, and road and roofing binders, of cyanogen as prussian blue and in metallurgy, and of benzol as a motor fuel. They will greatly influence the future cost of gas in the holder.

HOW BYE-PRODUCT PLANTS FIT INTO THE GAS BUSINESS.

The most interesting position to the gas engineer is the one in which the coke plant is owned and operated by the gas company itself. It is only under these conditions that he can appreciate the full value of the bye-product process; for it is possible with such a plant to put gas into the holder at the lowest cost of any process now in general use. Between 40 and 50 p.ct. of the total coke made can be sold as foundry coke, or about 90 p.ct. as blast-furnace coke, or any convenient percentage of the two together below those given. These two grades command a much higher price than the ordinary run of domestic coke; and this increase, together with the operating economies made possible in handling the large volumes of material at a low unit cost, can bring the cost of gas in the holder to an extremely low figure.

Too much emphasis, however, cannot be placed upon maintaining the coke market; for, while it is possible to make gas cheaper with the bye-product process, when the coke and the other bye-products are moving, it is also possible to run this cost up to a prohibitive figure, if these products—especially the coke—are not sold to advantage. More money can be lost under such circumstances than in any other of the gas-making processes. During the war, no plant had any trouble in disposing of practically its entire output as foundry and blast-furnace coke. Any that was left over was eagerly grabbed-up by domestic consumers. Now we are going through exactly the reverse condition. The foundries and blast-furnaces are absorbing very little coke, and the domestic consumer seems to have forgotten that cold weather will ever again come round. It is in these circumstances that the process is sorely tried, as a large coke-pile must be accumulated, and the cost of handling the material, even when it is finally disposed of, is considerably increased.

The bye-product oven that has the facilities for being heated by producer gas or blue water gas has, in circumstances like these, a great advantage over the straight coke-oven, as, in the former case, the full gas capacity of the coal is realized, against approximately one-half in the latter. The financial outlay for producers, however, is a heavy one; and generating blue water gas to heat the ovens is about as expensive as making carburetted water gas to replace that consumed in heating the ovens themselves. These are problems to be solved by each individual company.

At all events, the gas company who distribute gas supplied from bye-product plant, whether they own the plant or not, should make provision for an adequate reserve capacity. In nearly every case, coke-oven gas so supplied is only a part of the total gas distributed, and coal gas and water gas go to make up the difference. In such circumstances, the gas company are likely to have quite sufficient water-gas reserve to take care of the volume of coke-oven gas, should this supply cease or be reduced.

The quality of the gas furnished by a bye-product plant may or may not meet the requirements under which the gas company must distribute its product. Ordinarily, bye-product ovens should have no difficulty in furnishing 575 to 600 B.Th.U. gas; and in places where a higher calorific value is required, or a higher candle power (this gas usually tests about 13 candles with a flat flame), the difference in quality is made up with carburetted water gas.

CONCLUSION.

What is the future of bye-product gas in its relation to the gas industry? There are several ways along which this may work itself out. The replacement of natural gas is one; and should this be carried out, the coke produced will replace a lot of beehive coke now manufactured, and will also find a large domestic market. In this case, it is also very probable that the coke-plants will be owned and operated by the existing natural gas companies, and the coke be supplied to blast-furnaces which have not their own coke plant.

Should it develop that the steel industry brings about, more or less, the elimination of beehive coke by the erection of bye-product plants in close proximity to their furnaces or groups of furnaces, it is very probable that more gas will be produced than can be required by the various steel mills interested. In these circumstances, part of the surplus gas will probably be distributed by the various local gas companies situated in the surrounding towns. Should this not appear feasible, it is possible that some of the extra gas may be used in the generation of electric power. This is one branch of the bye-product business in which America has lagged behind European practice. There is but one large gas-engine installation in the country—at Lebanon (Pa.)—using bye-product gas to generate electric power.

A third solution of the problem is the supplying of a group of small towns and cities within a fairly well-populated area by a centrally located gas plant such as the one at Camden (N.J.) or Joliet (Ill.). In both these cases the various towns supplied had all outgrown their own small gas-making capacity, and a happy consolidation was the means of bringing about the erection of a centrally located plant and the subsequent high-pressure distribution of its gas.

In his Presidential Address to the Cleveland Institute of Engineers at Middlesbrough, Mr. F. P. Wilson said that manufacturers had often been asked to consume their smoke; and they had replied that it was impossible, or nearly so. But he asked whether the time was not coming when they would all be cleaning their furnace gas. This should do something towards purifying the atmosphere.

MIDLAND JUNIOR GAS ASSOCIATION.

The members of the Midland Junior Gas Association, to the number of 25, accompanied by Mr. C. CARRINGTON BARBER (the President), paid a visit last Saturday week to the works of the Stourbridge Refractories Company, Ltd., Shut End Works, at Pensnett, Dudley.

The party was received by the Managing Director (Mr. Astbury), and shown over the works. Mr. Astbury was accompanied by Mr. Vale, Mr. Bennett, Mr. Edwards, and Mr. Hewitt. It was stated that the works have been designed to manufacture 160 tons of fire-clay goods per day; but only half had been put down at present. The kilns, of the continuous type, and the gas-heated moulding stove for retorts and blocks were inspected with much appreciation. The members were greatly interested, too, in the various processes connected with the preparation of the clay for the final moulding operations.

THE EDUCATION OF EMPLOYEES.

After the inspection, tea was provided by the Company at the offices.

The PRESIDENT proposed a vote of thanks to the Directors of the Company for their kindness in allowing the visit, and for their hospitality. He coupled with the vote the names of Mr. Astbury, and Messrs. Vale and Bennett The afternoon had been thoroughly enjoyable, and the members had derived much benefit from the inspection of works conducted on such well-managed and scientific lines.

Mr. W. J. PICKERING (Birmingham), the Senior Vice-President, in seconding the vote, said they had all been impressed by the thoroughly up-to-date character of the works, and the high standard of efficiency realized in the various processes. They had a saying in the gas industry that "dividends were made in the retort-house;" and certainly they were all alive to the great importance of having refractory material of the highest class.

The HON. SECRETARY, in supporting the vote, thanked Mr. Astbury for the admirable arrangements made in connection with the visit.

Mr. ASTBURY, in reply, thanked the members on behalf of his Board for their cordial vote of thanks. The Company were now suffering from the aftermath of the war; and if they were to meet the requirements not only of gas-works, but of metallurgists also, throughout the kingdom, it was essential that a scheme for educating manual workers up to present day requirements should be put into operation. He was glad to say that his Company were already making arrangements for educating their employees. Although the outlay was considerable, it was felt that in the near future the initial cost would be amply repaid.

Mr. ERNEST VALE (Messrs. Vale & Sons) and Mr. W. BENNETT (Woodall-Duckham Company) also replied to the vote of thanks, and expressed their pleasure in showing the members round.

THE WORK OF A GAS CHEMIST.

A paper on the "Work and Problems of a Gas Chemist," which was read by Mr. G. WEYMAN, M.Sc., A.I.C. (of the Newcastle and Gateshead Gas Company), at a recent meeting of the Newcastle Chemical Industry Club, is summarized as follows by the "Chemical Trade Journal."

Mr. Weyman said that the work of a gas chemist covered a wide ground. It included both organic and inorganic chemistry, besides a large amount of work which, strictly speaking, belonged to other sciences. Physics and physical chemistry were especially required; while pure mathematics and geology were sometimes called upon. Problems in engineering were usually dealt with by experts in that science; but for the rest, it was the chemist who had to furnish the answer.

Dealing with the analytical section of the work of a gas chemist, Mr. Weyman said that, in the first place, raw materials had to be checked. The chief one—coal—was a problem in itself, not only regarding the obtaining of proper samples made up of many different types of coal, but also regarding examination of the sample for the required quality. To sum-up the relative qualities of two coals was not an easy matter. Other raw materials—such as oxide of iron, lime, sulphuric acid (when that was not manufactured at the gas-works), caustic soda, and (quite an important item) water—all required correct sampling and analysis, some of them being bought to specification or on an analytical basis, and special tests had often to be made as to suitability for particular purposes. As regards finished products, a close check was necessary on the chief product—gas. Constant gas analysis, with determination of the calorific value, specific gravity, sulphur, naphthalene, ammonia, and cyanogen, were needed, though much time and trouble might be saved by the use of recording instruments. The second most important product—coke—also needed examination in much the same way as coal. Many products—such as sulphur, spent oxide, sulphate of ammonia, and concentrated liquor—were sold on an analytical basis; while others—such as tar and tar products, benzol, toluol, solvent naphtha, motor spirit, naphthalene, and cyanogen compounds—were sold to specification, and therefore needed careful and duplicate analysis.

Speaking of the supervision of the chemical plant, he said that, since all the processes in a gas-works were chemical in their nature, it was obvious that the chemist must play the most important part in their control, and be responsible for the methods of working and the results obtained. It was for him to reduce losses to a minimum, report daily as to efficiency, and make suggestions as to improvements. The foreman had to take his instructions from the chemist regarding all details of the method of working. The chemist included in his supervision all the analytical work necessary to keep careful control and submit his daily figures to the chief chemist. Such supervising chemists were placed in charge of retort-houses, condensers and scrubbers, purifiers, water-gas, sulphate, concentrated ammonia, benzol, and boiler plants. His training tended to become specialized, and involved measurement of high temperatures, losses by radiation, conduction, diffusion, vapour pressures, gas pressures, &c. In connection with working trials, he mentioned that this section included trials of new plants, as well as special tests of established plants. Means of measurement of solids, liquids, and gases had usually to be improvised. A well-balanced judgment of the size of errors was essential. The sources of loss and efficiency had to be indicated, and suggestions made as to further avoidance.

Referring to the work of obtaining data for, and the introduction and working-up of, new and special processes, Mr. Weyman said this section really came under the heading of applied research. Sometimes difficulties were not realized until a process was applied on a large scale. More often a small-scale plant would supply an almost bewildering number of previously unrealized factors; and much time and trouble were wasted in neutralizing effects which on a large scale corrected themselves.

Clamp for a Submarine Pipe-Line.

A Pacific Coast Gas Association "Wrinkle" describes a device employed for stopping a leak in an 8-in. submarine high-pressure pipe-line. The leak was located 200 ft. from the shore, in 40 ft. of water. A diver reported it as a split in the pipe at right angles to the length; the hole being barely large enough to put his finger in. The line supplied industrial premises; but by good fortune the leak occurred on a holiday, when the plants were shut-down, so that the pressure was taken off the line without inconvenience. A split clamp was used; and on the side that covered the leak a strip of lead gasket was laid, with a little lead wool along the edges. The whole was filled with red lead and white lead putty. The clamp thus arranged was taken to its place by the diver, and put on with little difficulty. The job was done in one day; and when 40 lbs. pressure was put on the pipe there was found to be no leak. As, however, the repairs were considered temporary, it was decided to reinforce the clamp by a long split sleeve. A piece of wrought-iron 12-in. casing was employed; and this, with the aid of a welding torch, was made to just the shape desired. It was necessary to leave the clamp in place; and, to accommodate the extensions, short branches were fitted on the top and bottom of the sleeve. The bottom branch was capped; and the top one was reduced to 6 in. by welding on a socket. After the sleeve had been put in position, it was yarned at the ends with lead wool and hemp. Cement grout was then poured through the top branch. The cement was mixed on board the diver's boat, and placed in sacks. He had no difficulty in putting it in place. After puddling the grout, to make sure that it filled the sleeve, the top 6-in. plug was screwed-in, and the lead wool once more caulked. The joint has proved highly satisfactory.

Coal Deterioration during Shortage.

Some time ago, Mr. G. Cecil Jones called attention, in the "Journal of the Society of Chemical Industry," to a Bulletin of the United States Bureau of Mines in which Messrs. Porter and Ovitz dealt with the question of deterioration in the heating value of coal during storage. Mr. Jones suggested that the authors had overlooked a form of loss which might be several times as great as the small loss they had measured. The percentages of ash found in several lots of coal at successive stages in their storage, and the trend of these towards an increase during the storage of the coal, pointed, he said, almost irresistibly to the conclusion that there was a steady and far from insignificant loss of coal substance on storage. He added that the bulks were not weighed, and the deterioration measured was only that resulting from the fixation of oxygen—no account being taken of possible loss of coal substance in volatile form. Replying in the Society's "Journal," Mr. Porter quotes evidence to show that coal tends to increase slightly in weight during storage, and does not lose any appreciable amount of its combustible substance either by volatilization or by oxidation. It is, he declares, impracticable to draw any definite meaning from the variation in content of ash apparently found by the tests in the successive samples of coal. The variations were so irregular that averages are nearly worthless. Furthermore, if it were justifiable to draw any conclusions from such apparent increase of ash, there was found nearly as marked an indication of increase in the samples submerged in water, where no oxidation or volatilization is likely to have occurred, as in those weathered by exposure. These irregularities are to be ascribed rather to the personal equation in sampling, accidental inclusion of foreign inorganic material, and to the possibility that the lighter and purer parts of the test lots of coal may have been washed or blown away.

CORRESPONDENCE.

[We are not responsible for opinions expressed by Correspondents.]

South Metropolitan Gas Company and Coal Conservation.

Sir,—The answer to the inquiry of your correspondent "Yorks" is a very simple one. Owing to the complete and systematic control provided by our engineering and chemical staff, ably seconded by the co-partner foremen and workmen, we are able to obtain a very high efficiency from the carbonization of our coal in yield of heat units per ton. We have thus been able to reduce our coal requirements relatively, and have been spared any need of the too frequently used substitute of "stretching," which consumers in South London would certainly strongly resent.

We shall be very pleased to explain all this to your correspondent, if he will favour us with a visit, and will undertake to respect his anonymity, if he would prefer to introduce himself to us as simply "the man from Yorkshire."

Charles Carpenter.

South Metropolitan Gas Company,
Old Kent Road, S.E., Nov. 12, 1919.

[Dr. Carpenter attempts to beg the question raised by "Yorks" and other people; and we do not think that his reply will satisfy our northern correspondent, nor others who are interested. No figures are given in the letter to enable anyone to judge whether or not any endeavour was made by the Company to comply with the following instructions contained in the Board of Trade Order, dated Sept. 26, and which applied to all gas-works throughout the United Kingdom: "(2) No persons who supply gas under statutory authority shall use, or permit to be used, in the production of gas a greater amount of coal than will suffice to produce gas of a quality 15 p.ct. lower than the quality prescribed by any Special Act or Order for the time being applying to their undertaking. (3) No other persons who supply gas shall use, or permit to be used, in the production of gas a greater amount of coal than will suffice to produce gas of a calorific value not exceeding 425 B.Th.U. gross." Then the Board of Trade, in their communication of Oct. 7, announced that "the Gas and Coal (Emergency) Order, 1919, which prescribes a maximum calorific value of 425 B.Th.U. gross, and provides for the diminution of pressure in case of necessity, will also remain in operation." The Order referred to "all" gas-works; and no exception was made in favour of the South Metropolitan Company. Was anything done by the South Metropolitan Company after Sept. 26 in the way of reducing the consumption of coal, or in attempting to comply with the Board of Trade Order, infringements of which were summary offences against the Defence of the Realm Regulations? That is the question which requires a straight and positive answer.—Ed. G. J.]

"The Company on the Other Side."

Sir,—The tone of, and the temper displayed in, your comments in the current issue of the "Journal" upon certain statements alleged to have been made by the undersigned to a "poor newspaper man" would, I am sure, have been very considerably modified and the generation of much "hot air" avoided, had your sense of that fair play claimed for others led you to make a preliminary inquiry as to the facts.

F. M'Leod, Secretary.

South Metropolitan Gas Company,
709, Old Kent Road, S.E., Nov. 15, 1919.

[The above letter is no denial of the statements imputed by the "Daily Sketch" to Mr. M'Leod, and commented upon by us last week. It seems difficult in relation to questions such as this to obtain a direct answer from the South Metropolitan Gas Company. Therefore we put the questions rather more pointedly: Did Mr. M'Leod, or did he not, make the statements upon which comment was made? And was there any qualification of those statements of the character suggested by our article? There are allusions in the letter to "tone," "temper," "hot air," and "fair play." It was Mr. M'Leod who wrote the letter; we the comment of last week. In that comment appeared these sentences, which our correspondent, in the heat of the moment, has apparently forgotten or completely overlooked: "Whether the statements of the Secretary of the South Metropolitan Company were in any way qualified, we do not know. We hope they were. All that we can deal with is what was published; and we have not seen in the 'Daily Sketch' any protest from the Secretary on the ground of misrepresentation. In the circumstances, it can only be assumed there was no misrepresentation." In his letter, Mr. M'Leod uses the words "alleged to have been made." If there was misrepresentation in the "Daily Sketch," why was it not corrected? Last week, we gave an opportunity for explanation, which Mr. M'Leod has allowed to slip. We ask him to re-read the article, and then to write us somewhat more fully on the subject.—Ed. G.J.]

Step-Grate Furnaces.

Sir,—I think that Mr. Tully is mistaken when he states that the step-grate was patented about twenty years ago. We have papers showing that a combination of step-grate and grate-bar furnace was used by Messrs. Siemens in 1871.

A patent (No. 5320), in the name of J. M. Moerath, was taken out in 1883 for a purely step-grate furnace, in which he stated: "These consist of cast-iron plates arranged in steps, and are about 18 in. long."

Step-grate furnaces were put in by my own firm over thirty years ago—during the time when my grandfather, Mr. Jonas Drake, was actively associated with the business.

For Drakes Ltd.,
J. Wilfrid Drake, Joint Managing Director.

Halifax, Nov. 14, 1919.

The Italian Association and the Paris Visit.

Sir,—In No. 2945 of the "Journal" is a statement to the effect that the representatives of the Italian Gas Engineers Association were unable to attend the meeting called by the Société de l'Industrie du Gaz en France, on Oct. 13, owing to internal disturbances of th e country.

I have to beg of you to contradict the statement, as Italy has not been at any time (and is not at present) labouring under any such difficulties. The non-attendance of Italian engineers was justified by no such difficulty.

Thanking you in advance for your kind compliance.

Associazione Italiana delle
Industrie Gas ed Acqua,
Il Presidente: E. Sospisio.

Trieste, Oct. 29, 1919.

Are our Gas Appliance Makers Behind the Times?

Sir,—In connection with the above subject, which has been touched upon in one or two of your recent issues, a personal experience may not be out of place.

In my household for some time past there has been in use a gas-iron bearing the name "Clark's 'Fairy' Gas-Iron." I am not aware of the makers of this appliance, though it is supposed to be up-to-date by reason of the fact that it is equipped with both gas and air adjusters. But even during the war, while gas supplies were of poor quality, its use has always been accompanied by difficulty from obnoxious and poisonous fumes which, in addition to affecting the operator, permeated the whole household. The air-regulator being full open, the only possible means of overcoming was to curtail the gas supply, which, besides preventing adequate heating of the iron, caused the light to go out repeatedly; and so impossible was it to obtain satisfactory results that I determined to end it in one way or another. Judging that the air intake was too small in area, I considerably enlarged this by means of a file, with the result that it will now take the full gas supply without any inconvenience, and the heating is most satisfactory—dealing with the heaviest fabrics.

Appliances of this description launched on the market and placed in the hands of the general public are a sure means of securing condemnation of the use of gas for such purposes, and do a considerable amount of harm.

Again, two of the most efficient types of modern gas-fires which have had a great vogue since the first one was exhibited at the White City Gas Exhibition, are defective in that the burner of one is extremely difficult to remove, and the other impossible to remove without dismantling the whole appliance, which when used in a fire place suffering from decomposition of the gritty chimney lining renders the frequent clearing-out of the burners most desirable. This shortcoming is all the more surprising as in earlier patterns of fires made by the same people, the burners quite readily removed with the whole of the fuel *in situ*.

It will thus be seen that it is not always with the elimination of complication for the purpose of cutting-down manufacturing or selling costs, the deficiencies complained of are accounted-for. Faulty design or workmanship is also accountable in some cases.

In conclusion, I would like to suggest that all gas-irons issued or in stock should be examined and corrected by the gas departments concerned before further infliction upon the public.

Halifax, Nov. 11, 1919. Wm. Armitage Drake.

Policy and Perfumed Gas.

Will those correspondents who appear to be unaware of the fact kindly note that the "Journal" does not publish anonymous communications, unless accompanied, for the Editor's information, by the name and address of the writer. Nor have we space for such witticisms as: "Is the rumour true that the South Metropolitan Company are proposing to supply perfumed gas?" Further, we have no information upon which to found a reply as to whether it is true that the service cleansers have lately been extraordinarily busy upon naphthalene stoppages in some quarters of South London. Let it be clearly understood that the criticisms of the "Journal" are not directed to the policy of the administrators of the supply of gas in South London, but only so far as their policy has a bearing, or is brought to bear, upon the interests of the gas industry as a whole.

Huddersfield Gas Figures.—In the annual statement made on the 9th inst. with respect to the work of the departments of the Huddersfield Corporation, it was pointed ont, with respect to the gas department, that 934 million c.ft. of gas had been manufactured during the year ended March last. Cooking and heating stoves fixed on hire numbered 13,670, and 20,068 prepayment meters were in use. There was a surplus, after allowing for interest on loans and sinking fund, of £3557.

Demand for Gas at Chesterfield.—At a public inquiry into the "Greater Chesterfield" scheme, Mr. Johnson Pearson (the Chairman of the Chesterfield Gas and Water Board) said the sales of gas since 1896 had gone up from 58½ million c.ft. to 196½ millions per annum. He was opposed to the Gas Board being taken over by the Corporation, as there would then be no continuity of policy. He did not consider that committees of corporations were the best bodies to manage commercial undertakings.

REGISTER OF PATENTS.

Determining the Heating Value of Gases.

No. 116,707.

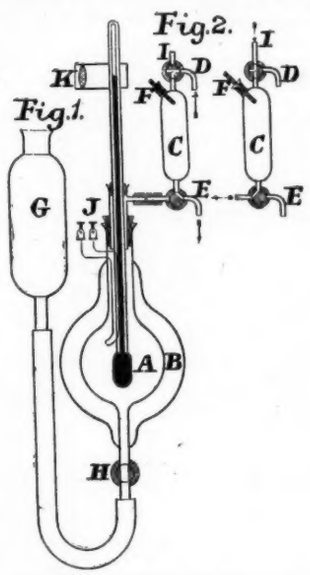
STRACHE, H., of Vienna.

No. 8960; May 30, 1918.

There are, says Dr. Strache in his specification, two different methods of determining the heating value of gases—viz., by means of a current calorimeter or an explosion calorimeter. The first method is employed in Junkers' and similar calorimeters; the second, when determining the heating value of gases by means of the calorimetric bomb according to Berthelot and Mahler, in which the rise of the temperature of the water surrounding the bomb is measured. The second method is also used in calorimeters in which the explosion of a mixture of gas and air takes place in a closed vessel and the heating of the vessel itself is measured (for instance) in the thermoelectric way. Yet another example is Strache's explosion calorimeter, in which the heat produced by the explosion is transmitted to a volume of air surrounding the vessel and acting as the calorimetric substance, which in this case also fulfils the office of thermometric substance.

The current calorimeters require a great supply of gas, and when in explosion calorimeters the radiation taking place during the ignition is not absorbed by the calorimetric substance, their readings are not very exact, as with different gases the radiations vary according to the velocity of ignition and the temperature of the arising flames.

For this reason, the calorimetric substance (air) was, in Strache's explosion calorimeter, arranged as a jacket of the explosion vessel. However, complications are created thereby, as generally inherent in the use of air thermometers (dependence on pressure and temperature); and it is not admissible to replace the air by a dilating liquid, for the



Strache's Explosion Calorimeter.

pressure caused by the explosion somewhat alters the volume of the explosion vessel, and this would entail inexactnesses in the readings of the dilatations of the liquid. All these drawbacks are overcome by arranging the calorimetric substance, which takes up the heat and serves at the same time the office of thermometric substance, inside the calorimeter, and preventing the irradiation by means of Dewar's non-conducting jacket, in which an evacuated chamber is (by silvering) protected against radiation.

Consequently, the invention consists in transmitting the heat produced by the explosion of a mixture of gas and air in a closed vessel to a thermometer arranged within the vessel, and whose mercury filling itself serves as a calorimetric substance, while radiation during the combustion is prevented by surrounding the vessel with a Dewar non-conducting jacket.

The gas is, advantageously, measured outside the explosion vessel either by sucking it in with the aid of a liquid, or by causing it to flow through a measuring chamber of known capacity. The capacity of the measuring chamber is chosen according to the gauging of the instrument. The measuring vessel may also be a piston cylinder, whence the gas is forced into the explosion vessel by means of a piston.

As all gases require for their complete combustion a multiple of their volume of air, the simplest way of transferring the measured gases into the explosion vessel consists in causing the combustion air to be added to flow through the measuring vessel, and thus to rinse the gas into the explosion vessel.

As is well known, gases often have a very narrow limit of explosion, wherefore the size of the measuring vessel must, according to the nature of the gas under examination, be brought into a correct ratio to the size of the explosion vessel. For this reason, the measuring vessels of calorimeters intended for the determination of the heating value of different gases are made interchangeable.

According to the foregoing statements, and as shown in fig. 1, the instrument consists of the explosion vessel A, within which the thermometer bulb is arranged, and which is enclosed in the evacuated, silvered jacket B. The measuring vessel C is, by means of rubber tube, so connected with the explosion vessel that the measured gas can enter this latter. The measuring of the gas is performed by permitting it to flow from the induction pipe D through a three-way cock into the measuring vessel, and thence through another three-way cock to the exit pipe E. Preferably a thermometer F is arranged within the measuring vessel for indicating the temperature of the gas, thereby enabling the results to be reduced to the normal temperature.

Fig. 2 shows the positions to be given to the three-way cocks for rinsing the gas into the explosion vessel. To this effect, the levelling bottle G, communicating with the explosion vessel by means of the cock H and containing a sealing liquid, is lowered; and by the air then entering through the pipe I (fig. 2), the gas is driven from the measuring vessel into the explosion vessel. This being done, and the whole explosion vessel down to the cock H filled with the mixture of gas and air, the cock is closed, and, by means of the conducting wires J, an electric spark is produced for ignition. The reading of the rise of temperature at the thermometer in the explosion vessel is made by means of the observing device K, and, according to the gauging of the instrument (by preference with pure hydrogen), it directly gives the heating value.

Treatment of Hydrocarbons.—No. 133,059.

FORWOOD, G. F., of Mark Lane, E.C., and TAPLAY, J. G., of Streatham Hill, S.W.

No. 17,869; Dec. 12, 1916. No. 18,363; Dec. 22, 1916.

This combined invention relates to passing the vapour of coal oil, shale oil, petroleum or lignite oil mixed with steam over hot carbon, so that the carbon liberates hydrogen from the steam, and this hydrogen is taken up by the oil—hydrogenating it.

Proposals of this sort have, the patentees say, been made before; but to secure success it is necessary: (1) That the temperature is not too high, as this destroys the oil; (2) that the carbon shall be in such a condition that it will decompose the steam at a low enough temperature—*i.e.*, not higher than 600° C.—not to injure the oil; (3) that there must be sufficient steam to ensure that enough is decomposed at the working temperature.

In order that the carbon shall be suitable, it must be in a physical condition in which it will decompose water at the temperature used. Thus, if an oil is being treated which demands a temperature of 500° C., the carbon must be able to decompose water at 500° C. Graphite, retort carbon, and coke are thus not available. The carbon must be prepared without being heated to a high temperature. Thus, if oil residue or carbonized oil is to be used, it must not be heated much above the working temperature—in fact, it is advisable to carbonize it as nearly as possible at the working temperature; but it may be heated beyond this within reasonable limits, though there is no object in so heating it. No rule can be given as to how high the temperature of carbonization can be carried without spoiling the carbon for this purpose; but there is no difficulty in giving instructions as to preparing suitable carbon. The temperature of operation on the oil varies with the oil—generally it is between 450° and 600° C.

Examples of the treatment of specific oils according to the invention are given as follows:

(A) For the production of lighter hydrocarbons by cracking, 140 c.c. of kerosene (boiling point 170° to 220° C.) were placed in a container having a small oil outlet pipe passing nearly to the bottom of the vessel. Air was pumped into the container over the surface of the oil until a pressure of 20 lbs. per square inch was attained. When the oil-valve was opened, the compressed air forced the oil through the outlet pipe and then through an injector, where it met and mixed with steam—perfect atomization of the oil taking place at this point. The atomized oil and steam passed together into a pipe or retort 3 in. in diameter and 18 in. in length, filled with wood charcoal (prepared by carbonizing wood at a low temperature—*i.e.*, at about 400° C.) heated to a temperature of about 570° C. The proportion of steam used was equivalent to 4·7 volumes of water to 1 volume of oil. The time occupied in passing the 140 c.c. of atomized oil through the retort filled with heated carbon was 65 minutes.

After passing through the retort, the vapours were led through a water-cooled condenser, and the condensed portion was collected in a receiver. The uncondensed vapours then passed upwards through a scrubber filled with scrubbing material—viz., small pieces of steatite—while heavy (creosote) oil passed through the scrubber in the opposite direction to the vapours. Before the creosote oil was used for scrubbing purposes, all the fractions below 240° C. were removed. In the receiver and scrubber about 48 p.ct. of the original volume of the kerosene was collected as a light oil of a boiling point between 49° and 170° C. About 40 p.ct. of the original volume of the kerosene remained unaltered, and was available for further treatment; while the balance of 12 p.ct. was converted into gas suitable for heating the retort or for steam raining.

A sample of gas collected at the outlet of the scrubber gave the following results on analysis:

Carbon dioxide, oxygen, and carbon monoxide together	28	p.ct. by volume
Hydrocarbons (methane, &c.)	7	,, ,,
Hydrogen	60	,, ,,
Nitrogen	5	,, ,,

This gas is a mixture of the gas produced from the oil and that produced by the decomposition of the steam used.

(B) For hydrogenation without cracking, 100 c.c. of a light cracked spirit (boiling point 53° to 150° C.) were treated in a similar manner to that already described. The temperature of the carbon (wood charcoal) in the retort was kept at about 500° C. The proportion of steam used was equivalent to 1½ volumes of water to 1 volume of oil. The time occupied in passing the 100 c.c. of spirit through the retort filled with heated carbon was 70 minutes. After passing through the retort the vapours were dealt with in a similar manner to that described under "A." In the receiver and scrubber about 95 p.ct. of the original volume of the cracked spirit was collected. The remaining 5 p.ct. was converted into gas suitable for heating the retort or for steam-raising.

A sample of gas collected at the outlet of the scrubber gave the following results on analysis:

Carbon dioxide, oxygen, and carbon monoxide together	25 p.ct. by volume
Hydrocarbons (methane, &c.)	4½ ,, ,,
Hydrogen	64 ,, ,,
Nitrogen	6½ ,, ,,

This gas is a mixture of the gas produced from the spirit and that produced by the decomposition of the steam used.

The hydrogenated spirit was compared with the spirit before hydrogenation by means of agitation with a saturated aqueous solution of bromine. The bromine is absorbed and decolorized by the unsaturated bodies present in the spirit, and the brominating was taken as complete when the last single drop of bromine solution remained a pale yellow colour after addition to, and agitation with, the spirit.

It was found that the spirit before hydrogenation required three times as much bromine as the spirit after hydrogenation required; therefore the hydrogenated spirit contained 66⅔ p.ct. less of the unsaturated bodies than was contained in the original spirit.

(C) For the removal of sulphur compounds only, 233 c.c. of light spirit distilled from a shale oil were passed with steam through a retort filled with carbon wood charcoal heated to a temperature of about 530° C. The proportion of steam used was equivalent to 2⅔ volumes of water to 1 volume of spirit. The time occupied in passing the 233 c.c. of spirit through the retort of the dimensions given above filled with heated carbon was 63 minutes. In passing through the heated carbon, the sulphur contained in the spirit was hydrogenated by the hydrogen produced by the decomposition of the steam; sulphuretted hydrogen being thereby formed, which escaped together with the other gases (carbon dioxide, hydrogen, &c.) at the outlet of the retort. The condensed spirit, together with that scrubbed out of the gases by the scrubber oil (heavy creosote) were collected and washed with a dilute solution of caustic soda in order to remove any sulphuretted hydrogen. This was followed by a washing with water to remove all traces of soda. The sulphur content in the finished spirit was found to be equal to 1·8 p.ct. by weight, whereas that in the original spirit was found to be equal to 4·9 p.ct. by weight. Hence there is a reduction of sulphur in the hydrogenated spirit equal to 3·1 p.ct. by weight, or equivalent to a reduction of 63¾ p.ct. of the original weight of the sulphur.

Low-Temperature Carbonization.—No. 133,554.

YEADON, J. A., and WHITAKER, T., of Leeds.

No. 257; Jan. 4, 1919.

In the ordinary system of high-temperature carbonizing in retorts, the patentees remark that, notwithstanding the high heat applied, the coal has to remain in the retort a considerable time (say, six to twelve hours) before it is suitably carbonized. It naturally follows that the lower the temperature of the retort, the longer will be the time required for carbonization, and the smaller the quantity carbonized per day in each retort of correspondlng dimensions. These difficulties are also still further increased in proportion as smaller sizes of coal are fed into the retort, "these lying very dead in the retort." Various schemes have been adopted to help to expedite this slow process of low-temperature carbonization by the use of internal shafts, travelling chains, and other appliances carrying stirrer arms, adapted to work inside the retort for the purpose of agitating or stirring-up the coal and working it through the retort, so as to secure more rapid carbonization. The present invention is "designed to meet and remedy the above-mentioned defects by combining the principle of low-temperature carbonization with two other important systems or processes, neither of which has hitherto been worked in conjunction with the same."

In the first place, the coal to be carbonized is reduced to a finely granulated condition; and this has two important advantages to begin with. It allows the use of the smallest, and consequently the cheapest, sizes of coal; also it permits every particle of the coal to come into quick contact with the surface or reflected heat inside the retort—thus securing rapid and almost instantaneous carbonization of the coal. This necessary finely granulated condition is further ensured by drying and partially heating the coal in the first instance.

In the second place, to further secure this rapid carbonization, instead of using a fixed retort as with ordinary low-temperature systems, the patentees propose to use a tapering revolving retort into which the coal is continuously fed at one end, quickly carbonized, and the coke continuously discharged from the retort at the other end.

These revolving retorts (iron or steel) are of a tapering or conical form, revolving horizontally on rollers, as described in patents No. 19,183 of 1889, No. 22,292 of 1891, and No. 104 of 1895; the fine coal being continuously delivered into the retort through its smaller end, and the coke continuously discharged from the opposite end. The bodies of the rovolving retorts have longitudinal corrugations (as described in the last-named patent No. 104 of 1895) which are said to secure three important advantages: They materially strengthen the retort body; increase the internal heating surface; and they serve to agitate and stir-up the thin layer of finely granulated coal in its passage through the retort, without the necessity for movable internal fittings. Self-sealed revolving-screw feed and discharge appliances, of the type described in patent No. 114,971, are fitted to the retort at opposite ends, so as to continuously feed the fine coal into the retort, and continuously discharge the coke, without ingress of air or egress of gas. The gas emitted is passed from the ordinary ascension pipe into the hydraulic main for treatment and use as required.

The discharged coke, it is claimed, is in an ideal condition for being agglomerated with a small proportion of pitch and converted into briquettes specially suitable for domestic or manufacturing consumption. The retort can be heated by part of the gas produced in it; and it is mechanically driven throughout with all its connections—thus reducing labour to a minimum.

The patentees do not illustrate their proposed apparatus; but they claim: An improved combination system or process of low-temperature carbonization, in which coal in a fine, dry, granulated condition is automatically and continuously fed, by means of a self-sealed revolving-screw feed-device, into the smaller end of a horizontally revolving retort of tapering or conical form having longitudinal corrugations, in such a manner as to ensure rapid low-temperature carbonization without the necessity for movable internal stirrer fittings within the retort, and in which the coke produced is automatically and continuously discharged from the opposite end of the retort by means of a self-sealed revolving screw discharge device.

Vertical Retorts.—No. 133,730.

JACKSON, G. J., of Esher, Surrey, and WOODALL AND DUCKHAM, LTD., of Thanet House, Strand, W.C.

No. 14,712; Sept. 10, 1918.

The patentees remark: Water gas has previously been added to hot crude coal gas made in horizontal retorts, so that the hydrocarbons in the latter automatically carburetted the water gas, and carburetted oil has also been added to such a mixture with the object of increasing the illuminating and calorific value. In a vertical retort steam has been superheated by its passage through a flue formed in the retort setting and passed along with the gas (also heated in the flue) through an opening into the retort. It has also been proposed in coke-ovens to employ the waste heat of the brickwork to decompose and vaporize a hydrocarbon which is injected into the oven by the operation of superheated steam or air. This proposition is "not of practical value," as in a coke-oven the temperature of the brickwork is very variable, and would not in many phases of the working vaporize the hydrocarbon, and thus its use is prevented. Further, in gas generators comprising vertical retorts oil has been vaporized in the flues surrounding the retorts—vaporized oil being introduced into the gas offtake leading from the top of the retorts.

According to their present invention, oil vaporized in a heated flue forming part of a vertical gas-retort is led by a passage into the retort and thus mixed with the gas. In some cases a jet of superheated steam or air may be introduced in order to remove any carbon which may have been deposited, and thus assist in keeping the flues clear.

Fig. 1.

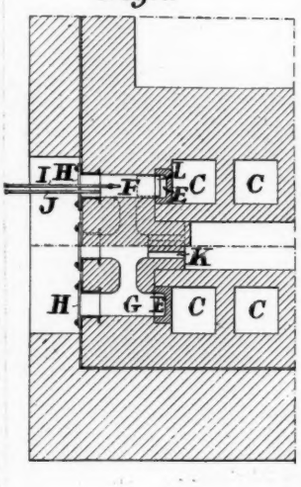
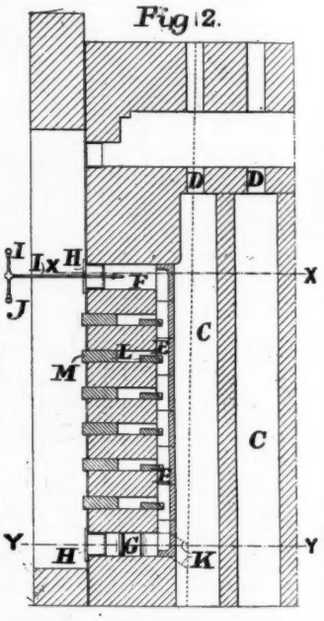


Fig. 2.



Jackson's (Woodall and Duckham, Ltd.) Vertical Retorts.

Fig. 1 is a horizontal section showing half a retort with the usual combustion chambers in their setting; fig. 2 is a vertical section, half of fig. 1 being taken on the line X and half on the line Y.

The retort is surrounded in the usual manner by combustion chambers C, into which gases are introduced through openings D at the top. Beside each end retort is a vertical flue E, which is heated from the chamber C, and opens at the top into a space F and at the bottom into a space G—the spaces being closed by doors H. Into the space F leads an oil-pipe I and steam-pipe J.

In order to enrich the gas produced in the retort, oil is sprayed into the space F and against the heated top of the flue E. The vaporized oil passes down the flue into the space G, and thence, by a passage K, into the bottom of the retort. In some cases, however, the oil may be introdued into the bottom of the flue E and pass out into the top of the retort.

When it is desired to remove any carbon deposited on the walls of the flue, steam is introduced by the pipe J. In the flue E are arranged dampers L, which may be adjusted by removing blocks M which normally block the spaces in which the dampers are placed.

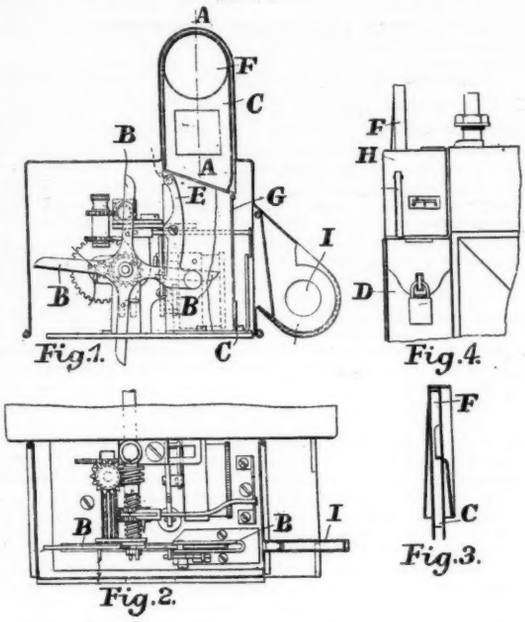
Coin-Operated Prepayment Meter Mechanism. No. 133,844.

ANDERSON, J., of Edinburgh.

No. 21,464; June 6, 1918.

This invention relates to a coin channel for prepayment meters (a fraud-preventive device) having its two walls (parallel to the plane of the coin) perforated below the coin aperture by rectangular holes

smaller than the coin of proper denomination and a curved deflector on one edge wall to cause the coin to properly strike an escapement.



Anderson's Coin-Operated Prepayment Meter Mechanism.

The illustration shows the invention applied to one form of the meter prepayment mechanism described in patent No. 130,347.

Fig. 1 is a sectional elevation showing the coin channel in relation to the prepayment mechanism. Fig. 2 is a sectional plan. Fig. 3 is a section on the line A. Fig. 4 is an outside elevation.

The primary member of the prepayment mechanism illustrated (fastened to the screwed spindle) comprises a plurality of arms B, one of which at any instant projects into a vertical channel C through which the coin drops on its way to the coin-receptacle D. The arm is at a sufficient distance below the mouth of the coin slot to ensure that the coin, when striking the arm, has momentum enough to overcome the friction of the various parts to be moved. The normal position of the arm is determined by stop-pins on the disc or arms, one of which makes contact with a tooth projecting from an escapement lever E. In the normal position, a pin integral with, or permanently fixed to, the escapement lever, lies in the coin-channel, and is displaced by a coin of the proper denomination as it falls. This moves the tooth out of the path of the stop pin, and permits the arm B to be moved by the impact of the coin.

In the fraud-preventive device illustrated, there are no moving parts projecting into the coin-channel except the arms B and the escapement pin. The walls of the tin plate of the coin-channel immediately below the coin-aperture F are perforated by rectangular holes smaller than the coin of the proper denomination. The coin, on being released from the aperture, falls downwards, and is deflected by a curved strip of metal so as to properly strike the escapement pin. If an attempt is made to insert a bent wire or strip of metal plate from the coin aperture down the coin channel to get at the escapement and arms, it is guided into one or other of the side channels. The end of the projecting arms or of the oscillating lever is so shaped that when a coin is to be rejected it bounces from the end through a slit G in the edge of the coin-channel, and through the side of the hinged casing into a receptacle provided for rejected coins. They are retained there by a hinged arm until pushed out by passing the finger through the hole I. On the other hand, in the normal position of the mechanism the oscillating lever offers little resistance; and the coin, if of the proper denomination, continues its downward descent through the coin-channel into the coin-receptacle. Projecting pins are inserted on the arms, so that if the coin is smaller than that of the proper denomination it does not displace the escapement lever but is deflected by the curved strip of metal on to one of the pins, from which it bounces into the receptacle for rejected coins.

A Tar Contract Dispute.—The Court of Appeal on Monday of last week dismissed an appeal by Messrs. Brotherton and Co., of Leeds, against the refusal of a Judge in chambers to stay an action under the Arbitration Act brought against them by the Allerdale Coal Company, of Workington. The dispute related to the delivery of coal tar; and the point was whether certain tests should be made at the defendants' or the plaintiffs' works. The Act provides for the settlement of these questions; and defendants asked that this should be done.

Waterford Gas Affairs.—Severe criticism was passed in the Waterford Corporation on the quality and quantity of gas supplied by the Gas Company. Mr. Jones said the city was practically in darkness, and the public were paying high prices for the gas. Alderman P. Quinlan objected to the Corporation paying £6 per lamp, when nearly all the lamps remain unlighted, and there was no light in private houses. The Mayor said the latest quotation from the Company was close upon £8 per lamp. Alderman Quinlan retorted that they should have the gas shut off altogether; but the Mayor said he feared they could not do this with risk of trouble, and added that he hoped the electric lighting scheme would go through.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

Progress of Bill.

The Ammanford Gas Bill was reported without amendment.

HOUSE OF COMMONS.

Lighting of the House of Commons.

Mr. WILSON-FOX asked the First Commissioner of Works whether he was aware that the inadequacy of the existing arrangements for artificially lighting the chamber of the House caused to many of the members great difficulty in reading; whether any report upon these arrangements had been obtained recently from a competent expert authority; and, if not, having regard to the improvements which had been made in recent years in methods of artificial lighting, he would take immediate steps to obtain such a report.

Mr. PARKER (Lord of the Treasury), who replied, said he was aware that the intensity of the light was not so great as it might be. The cause of this was that when the installation of electric light was designed it was considered better to keep the intensity down, and retain the colour effect of the gas lighting. It would be an easy matter to increase the intensity; and if it was the general wish of the House, he would give instructions to have this done. In regard to the employment of a competent expert, the Department's officers had as wide an experience of lighting, and were quite as competent as any outside authority.

London Gas Companies and Financial Hardships Procedure.

Mr. GILBERT asked the President of the Board of Trade what procedure his Department adopted before they allowed London Gas Companies to increase their charges to consumers under the Statutory Undertakings Temporary Increases of Charges Act, 1918.

Sir A. GEDDES in reply to the question issued the following statement:

The Board of Trade require that notice of any application made to them under the Act in question shall be served by the company upon all the local authorities within their area of supply. The application is also advertised in a local newspaper. The advertisement and notices must state that any representations in regard to the proposed increase of price should be sent to the Board of Trade and copies to the company within fourteen days. The Board also require the company to supply them with detailed statements showing the financial state of the undertaking, and estimates of the effect of the increased charge. The financial statements and estimates are carefully examined by the Department with the assistance of an accountant, with a view to compliance with the requirement of the Act that no modification of the charging powers shall be authorized which is more than sufficient with due care and management to enable the dividend allowed by the Act to be paid. Any representations made to them by local authorities or persons interested are considered; and if the Board of Trade are satisfied that the company are entitled to relief under the Act, an Order is made accordingly. Provision is made in the Order that no dividend shall be paid by the company until a certificate has been furnished to, and accepted by, the Board of Trade, signed by an accountant approved by them, that the accounts of the company are correct and are compiled in accordance with the statutory requirements relating thereto; that the revenue account has not been debited with any expenditure of an improper nature, or different in character from those usually debited by the company in the revenue account for any previous year, and if the amount carried forward to the following year is greater than the corresponding item in the preceding year, the certificate must contain a statement explanatory of the increase.

The Calorific Power Standard.

Major BARNES asked the President of the Board of Trade whether, in view of the war now being over and the need for explosives past, he would enforce the regulation requiring gas companies to supply gas to a certain calorific standard.

Sir A. GEDDES replied that the statutory requirements as to quality of gas were enforced by the local authorities and not by the Board of Trade. Last June, however, owing to the coal situation, the Board of Trade suggested to local authorities that they should refrain from taking proceedings against gas companies in respect of deficient calorific power in cases where the calorific power did not fall below 450 B.Th.U., or where the percentage of incombustible constituents in the gas was not excessive. At that time the Board hoped that by the end of October this suggestion could be withdrawn; but he was afraid it would be necessary to renew it until the end of April, owing to the difficulties which had been experienced in accumulating sufficient stocks of coal at gas-works to meet the demands for gas during the winter.

Coal Carbonized in Bye-Product and Beehive Ovens.

Mr. ATKEY asked the Parliamentary Secretary to the Ministry of Munitions whether he was aware that the Director of Steel Production compiled statistics showing the amount of coal carbonized both in patent bye-product ovens and in beehive ovens in the years 1917 and 1918, and whether he would now publish these figures for each method of carbonization.

Mr. HOPE replied that the only figures available were those for the production of metallurgical coke for the years 1916, 1917, and 1918. The figures were: 1916, 13,422,195 tons; 1917, 13,801,607 tons; and 1918, 13,277,007 tons. The subdivision between bye-product, beehive, and retort-ovens could only be given for the year 1917—viz.: Bye-product, 10,866,673 tons; beehive, 2,411,244 tons; retort, 523,690 tons.

Stoke-on-Trent Coal Supplies.

Mr. FINNEY asked the Prime Minister whether his attention had been called to complaints made at Stoke-on-Trent respecting the way that

the Coal Controller's Department had disregarded the Borough Council's repeated applications for proper supplies of suitable coals for the gas and electricity works; whether he was aware that the quantity had been seriously reduced; that the supplies they had arranged to receive from local collieries had been diverted and taken elsewhere out of the district; that inferior coals had been brought all the way from Durham at an extra charge of 8s. 3d. per ton; and that the Durham coal had been tested and proved much inferior and, for gas and bye-product-making purposes, showed a further loss of 15s. 11d. per ton—making a proved loss of £1 4s. 2d. per ton; whether he was aware that the Corporation was not allowed to purchase coals direct from the collieries, and that the coals were supplied through agents appointed by the Coal Controller's Department, which entailed a further loss to make profits for middle-men; and whether he could arrange for the Corporation to obtain their coal supplies from local collieries as before.

Mr. Bridgeman (the Parliamentary Secretary to the Board of Trade), who replied, said that attention had been called to complaints with regard to supplies of coal for the Stoke-on-Trent Gas and Electricity Works; but he understood that both works were receiving supplies sufficient to meet their requirements. He could not accept the statements made as to the inferiority of Durham coal. It had recently been possible to restore a substantial quantity of local coal to the electricity works. It was not the fact that the undertakings were required by the Coal Controller to purchase supplies through middlemen; but he understood that certain fuel for the electricity works passed through a washery belonging to a firm who also acted as coal factors.

LEGAL INTELLIGENCE.

WOKING DISTRICT GAS COMPANY'S RATING.

Appeal against the Assessment in Woking Parish.

The following report [which is taken from the "Surrey Advertiser"] of an appeal of the Woking and District Gas Company against the poor-rate of the Parish of Woking should be read in continuation of the successful appeal of the Company in the adjoining Union of Chertsey, recorded in the "Journal" for May 13, p. 381. Though on the present occasion the appeal was dismissed, over the entire undertaking the Company have obtained a substantial reduction even on their old assessment—thus wiping out altogether the contemplated increase which gave rise to the appeals in question.

The hearing now referred to was before a special sitting of the Surrey Quarter Sessions at Kingston, and, with an hour's interval, occupied five hours. The case was heard by Sir Charles Walpole (Chairman), and a Bench of Magistrates.

Mr. Henn Collins appeared for the appellants, and Mr. Cecil Whiteley (with whom was Mr. R. E. Otter) for the respondents.

Mr. Henn Collins said the appeal was from a rate made on Oct. 1, 1918, upon assessment made in June, 1918, in the parish of Woking. The new assessments in June, 1918, in respect of Woking parish upon the gas-works and land occupied by mains and appurtenances, were £4100 gross and £1820 rateable. Counsel gave the figures of the Company's receipts and expenditure, prepared by their valuer, Mr. W. G. Cooke, Assoc.Inst.C.E., based on the accounts for 1917. The gross receipts were put at £21,582, and working expenses at £14,514, leaving net receipts *plus* rates and taxes, at £7068. The question was what proportion of this was a tenant from year to year likely to part with as rent. The first thing was to estimate what capital he would have to put into the business; and on the figures of the Company's undertaking, Counsel placed it at £21,698. Allowing a tenant 10 p.ct. trade profit, 5 p.ct. interest on capital, and 2½ p.ct. to cover risks and contingencies, they arrived, through the total of 17½ p.ct. on £21,698, at a gross value of the undertaking of £3268, as against the present assessment of £4100 on the works alone, leaving out of consideration what existed in other parishes and the mains in Woking itself. In order to arrive at the rateable value of the undertaking, they had to take the statutable deductions in respect of repair and maintenance of plant, manufacture of gas, &c. These counsel put at £4167, which, he said, overtopped the gross value, leaving on the whole of the undertaking no rateable value at all. This was their contention in the Chertsey case, and it was their contention to-day.

Evidence was given for the appellants by Mr. *Cooke*, Mr. *Leonard Askew*, and Mr. *B. D. Holroyd* (the Secretary of the Company).

Mr. Whiteley, for the respondents, said that here were substantial works covering 3 acres of land; and the undertaking, in which the owners were also the occupiers, was doing so well that in 1917 and 1918 the occupiers were able to distribute nearly £5000 in net profits. And the extraordinary submission put before the Court by counsel for the appellants was that, where an owner and occupier were the same person, occupying those works and making that profit, there could be no rateable value. He questioned the estimates submitted by Mr. Cooke, and contended that, on the facts given in evidence, there was a rateable value not only of £910, but of very much more.

As their expert witnesses, respondents called Mr. *Donald Dinwiddy* and Mr. *W. H. Eve*.

Mr. *Dinwiddy* said that, finding the Company paying a dividend of 5½ p.ct., he formed the opinion that, if it was to be rate free, there was not a gas company in London who ought to pay rates.

The Chairman said the assessment would be confirmed; the appeal being dismissed with costs.

Theft of Gas at Goole.

John Proctor, a Goole labourer, was fined £15 for stealing gas by disconnecting a meter and inserting a circuit-pipe. It was stated that defendant had been formerly in the employ of the Goole Urban District Council at the gas-works, and that the disconnection had been so cleverly carried out that it would be possible for a meter inspector not to notice it unless he made a very close examination.

MISCELLANEOUS NEWS.

THE COALOWNERS' PORTION.

Discontent with the Proposed One and Twopence Profit.

So often has the "Journal" commented upon matters that affect the price of coal, and not always in a manner pleasing to the colliery owners, that it is only right when opportunity offers that our columns should give space to the coalowners. If there is one thing against which the gas industry is seriously protesting at the present time, it is injustice; and what it objects to in the treatment of itself, it must object to (if warranted) in the treatment of others—though they be coal-owners, who have not always shown the sincerest or most generous form of consideration for the gas industry. There was a luncheon at the Savoy Hotel last Thursday, at which there were present, by invitation of the Coal Association, a large number of gentlemen interested in the mining industry, and a good sprinkling of guests. Subsequently there were speeches; but we will only quote from two of them to show the questions at issue between the colliery owners and the Government—a speeech by Mr. R. Wallace Thorneycroft (who presided) and one by Lord Gainford.

The Increase of Six Shillings.

Mr. R. Wallace Thorneycroft said those present would be expecting to hear something from him about the 6s. increase in the price of coal, imposed by the Government in July last, to cover the increased cost of production, due to the Sankey wage and the seven hours. Mr. Hodges, the Secretary of the Miners' Federation, had published some figures that seemed to indicate that a considerable reduction in price was possible. He estimated the cost of production at 26s. 0½d. per ton. This estimate seemed to be deduced from figures given by Sir Auckland Geddes in a reply to a question in the House of Commons in July last. The principal item in the cost of production, of course, was wages; and the figure given by Sir Auckland worked out at about 19s. 7d. per ton raised out of the total cost to the owners at the collieries of 24s. 6d. The remaining 1s. 6d. per ton was made up by the suggested profit to the owners and Coal Mines Department expenses, &c., making a total of rather more than 26s., as stated by Mr. Hodges. There was no precise information as to the collective cost per ton of coal raised for wages since the seven hours came into operation; but assuming that the earnings under the seven hours were approximately the same as they were before, it seemed probable that the actual wages cost to-day was in the neighbourhood of 21s. Timber supplies and other costs were probably somewhat in excess of Sir Auckland Geddes' estimate of July, but that was a small item. Consequently it was extremely probable that the actual cost of production was at least 1s. 6d. more than the figure given by Mr. Hodges. The approximate collective cost for wages per ton of coal raised in September, 1914, was about 6s. 3d.; in September, 1918, 14s. 4d.; and in September, 1919, 21s. It was the wages cost of coal that governed the price at which it could be sold. During the inquiry by the Coal Commission a great deal was heard about extravagance and waste; and although it might be true that certain alterations in the law relating to minerals and other matters suggested by the coal owners' evidence would improve the cost of production, all these possible improvements were measured by a few halfpence—hardly noticeable in relation to the tremendous advance in cost due to wages. Turning to the other side of the account, it was quite true that in July last Sir Auckland Geddes underestimated the quantity of coal available for shipment, and underestimated the price that would be realized for that coal. Consequently the nominal profits of the exporting collieries had been large; but on the average of the whole country, it appeared likely that the home consumer was getting his coal at just about the cost of production without any profit to the owners. The fact was the coalowners who were doing their best to maintain exports at as large a volume as possible, and at as high a price as possible, on which, from a national point of view, so much depended, were acting as revenue collectors for the Government. They were tax gatherers to some extent, with the usual odium attached to the occupation. But the home consumer was not the individual taxed; and it was entirely a matter for the Government to decide as to whether the bulk of the profit arising from high export prices should be devoted to reducing the price to the home consumer, or to the revenue of the nation. The fluctuations of prices for export due to the world-wide disturbance of the coal trade were impossible to forecast; and while the present profit might be considerable, it seemed clear that Mr. Hodges's estimate was very much overstated. The system of advancing prices under control by a uniform figure, no matter what the quality of the coal might be, had created all sorts of difficulties that upset the whole balance of the trade. As a buyer of very large quantities of coal for the steel works with which he was connected, he did not want to buy subsidized coal, even if the subsidy was paid by the excess price realized from exports. He would prefer to pay an economic price to cover cost and reasonable profit to the coalowner, because he then had some chance of gauging the changes in price that he had to face when considering contracts for the sale of steel. With any subsidized article, experience of late had brought it home to all of them that a change might take place at a day's notice, which was most disconcerting, and prevented a return to normal conditions of trading. Above all, he wanted to buy what coal suited him, and not what was allocated to him to take or leave. In short, he was satisfied—speaking with wide knowledge of the trade, both as a producer and consumer—that the sooner they were free from control the better it would be for all concerned. It appeared to him that there had been much exaggeration about the strained relationship between employers and employed before the war. His friend Lord Gainford was going to speak on the "1s. 2d. Bill" the Government proposed to introduce. There was one thing of which he (Mr. Thorneycroft) was quite sure; and it was that when Mr. Bonar Law accepted Mr. Justice Sankey's report, he did not understand that, if he enforced 1s. 2d. as a reasonable profit, he would be tearing-up and scrapping an agreement made during the war by

the coalowners with the Government, and solemnly confirmed by an Act of Parliament.

THE PROPOSED LIMITATION OF PROFIT.

Lord GAINFORD said the Mining Association had been informed by the Coal Controller that the Government contemplated introducing into Parliament within the next few days a Bill to limit for the current year the profits in the coal trade to 1s. 2d. per ton. The Council of the Association had asked that their various colliery districts in Great Britain should be consulted in regard to any legislative proposals of the Government relating to the future of the coal trade; and the Central Coal Commitee were proposing before the end of the week, to communicate with each district with a view to securing a general expression of the trade on the 1s. 2d. limitation-of-profit proposals at their Representative Council Meeting on Friday. The limitation of profits by the State for any period by an Act of Parliament in connection with the coal or any other trade seemed to be absolutely without precedent, and impossible to justify. The proposal apparently was being put forward by the Government to enable them to carry out "in spirit and in letter" the pledge given by Mr. Bonar Law in regard to the recommendations of Mr. Justice Sankey in his interim report of March last. The recommendations of Mr. Justice Sankey on that occasion were not confined to the subject-matter upon which witnesses were called upon to give evidence at that period of the inquiry. The witnesses were instructed to confine their evidence to matters relating to wages and hours; but Mr. Justice Sankey recommended, on the assumption that the workmen would not strike, that absenteeism would cease, in reliance on other pledges of a similar character given by Mr. Smillie and his friends, and on the anticipation that the output would reach 250 million tons, that the profits in the coal trade might be limited to 1s. 2d. a ton. There were several other recommendations made by Sir John Sankey outside the question of wages and hours, which had not been carried out in spirit or in letter by the Government; and the coal trade saw no justification why the 1s. 2d. recommendation should be now accepted by the Government, especially as it was based upon a series of assumptions which had been subsequently falsified. It must, he thought, be obvious to every fair-thinking man that if it was even true that 1s. 2d. was the average profit in the coal trade for a period of five years before the war, the circumstances had been vastly altered in which the industry was now being carried on. An increased working capital was required to finance the undertakings as compared with the period before the war. There was a decreased purchasing power of money, all commodities ruling at prices varying from 100 to 200 p.ct. higher, and all classes of wages and salaries had been increased to meet the new conditions. There was an enormously higher cost of materials necessary to equip and develop collieries, many of which were starved during the period of the war. It would cost two-and-a-half times more now to sink and equip a new colliery as compared with the pre-war period. To now limit the profits to 1s. 2d. would represent only about 5d. per ton contrasted with the pre-war position; and it was obvious that, if a limitation of this kind was to be imposed upon the trade, there could be no interest whatsoever in the effort to reduce costs, to increase production, or to undertake progressive development work, much less to sell coal to the foreigner at the prices which were not going to be remunerative to those firms who had command of the export trade. The 1s. 2d. was strongly resented, as the figure was not a fair indication of what the average profits were before the war; and the evidence of Sir Lewes Dickinson had never been sifted, and his figures had never been accepted. The standard profits which were, however, accepted by the Government in the Agreement Act of February, 1918, were based on the years immediately before the war, which showed the colliery profits to be then £25,000,000 a year. If the Government proposed to press their Bill to limit the profits to 1s. 2d. on the output of the past seven months of the current financial year, which showed only 215 million tons for the year, it was equivalent to depriving the coal trade of half their pre-war profits, which were earned in a period when capital was receiving a much smaller rate of interest than it could now command. Therefore the coal trade and its shareholders, numbering 150,000 individuals, could only regard the proposal if it was pressed as sheer robbery and confiscation. Moreover, coal owners had been working on the Agreement Act, which was still in force, and to deprive them of the profits realized during the past few months would add a further injustice. Dividends in some cases exceeding the 1s. 2d. per ton had already been distributed; and if firms were now called upon to hand over to the State all sums over 1s. 2d., it would cripple the industry. The point, however, which the trade desired to make public, and on which they sought the support of those interested in all other industries and trades, was that there was no right whatsoever for a Government to impose any special limitation of an exceptionally harassing character on one industry alone. The coal owners claimed that they had played the game during the war. They had found the capital for carrying on the industry and supplying fuel to all firms, according to the directions of the Government, to the neglect of their own permanent interests. They believed that the public as a whole must realize that to handicap an industry and deprive the ordinary shareholders of all dividends, as in many cases the proposals would do, and in all other cases so reduce the dividends as to give them quite an unfair return on the capital invested in the industry, without any regard to the risks involved in a mining enterprise, was a precedent which ought not to be supported in Parliament, and must be condemned by all fair-thinking men. To single-out one trade for such treatment was obviously most unjust, unparalleled, and ought to be opposed. If the miners could realize how their own employers were being prejudiced, and to the detriment of the welfare of the industry in which they were employed, they would rebel against this limitation being pressed upon the owners by the Government. It was only fair to the mineowners that the public should know that the high price of coal was due to the high costs created by the Government in raising the minimum wage. In his own county it was 13s. 8d. a shift. He knew of collieries where 60 or 70 p.ct. of the men had been sending out less than 2 tons per shift and getting this minimum, and where the rest of the men in similar working places had been getting (at piece rates) over 4 tons per shift. Such restriction in output added shillings to the working cost. It was with a view to securing equal treatment for the shareholders of colliery companies that he was appealing to those present to do their utmost to see that no injustice was done by Parliament to one of the greatest industries in the country.

BIRMINGHAM GAS DEPARTMENT APPOINTMENTS.

Alderman J. H. Lloyd, the Chairman of the Birmingham Corporation Gas Committee, paid tributes to the services rendered to the department by Mr. Arthur W. Smith, the new General Manager and Secretary, and by Mr. John Foster, the new Chief Engineer, at the last meeting of the City Council.

In asking the Council to confirm the recommendation of the Gas Committee [*ante*, p. 119], Alderman Lloyd said that Mr. Smith had been practically doing the work of his predecessor, Captain R. S. Hilton, not only during the latter's absence owing to the war, but to a large extent before; and he had done it exceedingly well. Through having been trained in the works, he had acquired practical knowledge of the operations of the department; and he had also been able to take charge of the coal purchasing branch. As to Mr. Foster, for the past ten years a weekly meeting of the staff had been held at which the Engineers of the works conferred with the Chief Chemist, Main's Engineer, and the Secretary and Manager. This arrangement had worked very satisfactorily; but the time had come when the Committee considered it advisable to appoint some one to co-ordinate the various works, and advise the Committee in reference to new plant, development of works, and so on. Rather than take a man from outside, the Committee were pleased to be able to promote one of their own staff to the position of Engineer-in-Chief. Mr. Chaney and Mr. Foster were the two Senior Engineers in charge of large works; but Mr. Chaney's health would make it impossible for him to undertake the work. Indeed, he had informed him (Alderman Lloyd) that he did not think it would be possible for him to continue the management of the Saltley works. Mr. Foster had been with the department since 1902 as Engineer at Windsor Street. He had been a most successful gas manufacturer; and the Committee had every confidence in recommending him for the appointment.

The recommendations were unanimously adopted.

A LOSS AT WALSALL EXPLAINED.

Report by the Gas Committee.

The report of the Walsall Gas Committee, just issued, upon the present position, management, and finances of the undertaking, is a somewhat interesting document. Though a loss was made upon last year's working, the report states, it was by no means exceptional; and mention is made of the fact that the amount which was paid for the many increased charges was £22,881. Having to take a large proportion of coal from Durham alone increased the expenditure by several thousand pounds; and though the price of gas was raised upon two occasions, it was not advanced as greatly, or as quickly, as it should have been to prevent a loss.

With regard to the allocation of £6000 in relief of the rates, the report states that, when the allocation was agreed to, there was a balance of unappropriated profits which amounted to £15,085; so that the Committee were not allocating profits which had not been earned, as had been suggested was the case. On the contrary, a balance of £9085 of unappropriated profits from past years remained available to meet any loss which might be incurred. The loss last year was due to no fault of the Committee, or management, apart from the failure to raise the price of gas sufficiently to meet the rapid increases in the cost of production.

Reference is also made to the installation of vertical retorts (which has been approved); and the report estimates the net saving for the last 3½ years, if the Committee's report had been adopted in 1915, as £24,855. The effect of the delay has been to increase the capital cost of the installation from £18,521 to over £40,000. It is also pointed out that, since the undertaking was municipalized in 1876, £208,120 has been applied to the relief of the rates, and not a penny taken out of the rates for its upkeep.

A PURCHASE BILL AT SUNDERLAND.

The decision of the Sunderland Town Council, at a recent special meeting in committee, not to proceed with the purchase of the Sunderland Gas Company's undertaking, was reversed at the meeting of the Council last Wednesday, when it was decided to promote a Bill in the ensuing session of Parliament for taking over the concern. The subject came before the Council on a recommendation by a Committee consisting of the whole Council that they do not promote a Bill to purchase the undertaking.

Alderman Dr. GORDON BELL, moving an amendment in favour of purchase, appealed to the business men on the Council to say whether municipalization was or was not a commercial proposition. The Borough Accountant had shown that the Company had appropriated out of surplus revenue £74,000, and used it for capital expenditure. This and a great deal more, amounting in the aggregate to £153,000, seemed to have been illegally taken from the gas consumers of the town. The remedy was in their hands, and they had failed to make use of it. It was that, under the General Act, which was incorporated in the Sunderland Company's Act, a Court of Quarter Sessions might, on the petition of two gas consumers, order that the accounts of the company be examined; and that where the profits for the preceding year had exceeded the prescribed rate, the company should make a corresponding reduction in the price of gas supplied by them. Were they, as the largest gas consumers in the town, to allow the Company to

appropriate a surplus that by law should have gone to the consumers? The Company had accumulated, after paying dividends, a sum of £134,845; and they had redeemed their capital in the last sixty years. They had now a surplus of £54,000, with which they did not know what to do, and which appeared in the Borough Accountant's figures as an unappropriated surplus. He thought any arbitrator would take these points into consideration in arriving at the purchase-price to be paid. The matter had been approached with prejudice; but it was now for the Finance Committee to go thoroughly into the question from a business point of view.

Mr. F. NICHOLSON (the Chairman of the Finance Committee), in reply to a question as to why the gross profits of the Company had shown a decrease every year since 1915, said it was because electricity had superseded gas for street lighting, and because of war restrictions on public lighting.

The TOWN CLERK estimated that it would cost £2000 to carry a Bill through Parliament—more, if the Bill was opposed.

The amendment in favour of purchase was carried by 25 votes to 18—four members being neutral.

The TOWN CLERK pointed out that the Council would be required to confirm their decision, at a later stage, by a clear majority of the whole Council, which means that 33 votes will have to be cast in favour.

The Sunderland Trades and Labour Council are organizing a petition to the Corporation requesting that an inquiry be held into the present value of the gas undertaking, and into the total amount of surplus profits invested since 1857. The Trades Council allege that the Company have used surplus profits amounting to "hundreds of thousands of pounds" in increasing their assets, instead of reducing the price of gas, as the Act of Parliament plainly intended should be done. They ask the Corporation to secure the restitution of these diverted profits, and also urge the Town Council, while rescinding their decision against municipalization, to resist payment for such assets of the Company "as already rightfully belong to the public."

NOTTINGHAM GAS SUPPLY.

Amplifying previous general complaints, some very strong criticism of the indifferent quality of the Nottingham Corporation gas supply was forthcoming during the recent municipal elections, which resulted in the rejection of two members of the responsible Committee; and, departing from its usual policy, the leading local newspaper, the "Daily Guardian," joined on Thursday in the attack, by the publication of a leading article, from which the following is taken:

> The time has now come for an emphatic protest against the wretched quality of Nottingham gas. A mild protest has been made several times in these columns, but no notice has been taken; and, as we have been officially told more than once that the bad quality of the gas was due to the war, we have been content to wait. But the gas was bad before the war; and now that the war is over it is no better, or so little better that consumers cannot distinguish any difference. It is therefore really surprising that the people of the city have taken the gas nuisance lying down for so long; and it would be well if they were now to assert themselves with a little more energy. The gas in the city is dear; and it is, to speak plainly, rubbish. In most towns there is better gas, and at a lower price. The gas is useless for the purpose of illumination without incandescent mantles. . . . We believe that, even for cooking purposes, it is of very little use, on account of the poor heating qualities it possesses; and unless the Gas Committee are prepared to attend to the almost universal complaint in reference to the bad quality of the gas, and give the public something better, the consumers will have to take some action in their own interest. There is good reason to believe that the success of the labour candidates in the recent municipal elections was not entirely unconnected with this question. Many consumers of gas are very resentful of the high-handed way in which they have been treated, and are not at all disposed to look over it.

Following upon this criticism, Mr. John Wilkinson (the City Gas Engineer) has hastened to assure the public that many improvements have been effected in regard to illuminating power. Commenting upon the article referred to, he has expressed his surprise that such statements as it contained should have been made within a few days after the quality of the gas had been raised 25 p.ct. Until a few days ago, the Government prohibited the distribution of gas of a higher quality than 425 B.Th.U.; but as soon as the intimation appeared that the restrictions were relaxed, the Committee raised the quality to 500 B.Th.U. Everybody, Mr. Wilkinson adds, might not have noticed a difference, because many people did not seem to be aware that their lighting appliances needed readjusting when the quality of the gas was altered; the quantity of air to be admitted having to be regulated to suit the gas. He emphasized the fact that gas undertakings are no longer able to pick and choose their own coal—being obliged to take whatever the Government may allot. Moreover, he points out that the plant, after four years of war, during which it could not be kept up to the old degree of efficiency, has not yet been brought back to its former condition. This is being done; but mechanical and labour difficulties are considerable.

GAS FOR "FLU" GERMS.

A correspondent, in sending on the following extract from a weekly paper, points out that coal gas from which the sulphur compounds have *not* been extracted will, on combustion, charge the atmosphere with just about sufficient sulphur dioxide gas to effect the bactericide necessary to give the "relative immunity" referred to, while being "quite satisfactory for breathing;" and that, by the use of gas for lighting workrooms during the periods of epidemics of influenza or the other infectious conditions of nose, throat, and bronchial tubes alluded to, the preventive object in view might easily be attained.

[EXTRACT.]

The progress of the influenza wave continues; but the number of cases remains small by comparison with last year's epidemic, says the Medical Correspondent of the "Times." The pneumonias, too, which follow influenza in some cases, are of a milder character than was encountered formerly, though there continue to be a number of deaths.

Some progress, meantime, is being made in the method of prevention and treatment, which was discussed in these columns six months ago. It was found during an epedemic of cerebro-spinal fever that, if the population of a camp was passed daily through an inhaling-room, where the air was kept charged with droplets of a solution of zinc sulphate, the incidence of the disease was checked. Following on this observation, Dr. Gregor noted that certain industrial employees who worked in an atmosphere charged with a small amount either of nitrous oxide or sulphur dioxide gas exhibited what the "British Medical Journal" calls "a relative immunity" to influenza at a time when fellow-employees who were not working beside these gases were heavily attacked. Dr. Gregor found that the air in the rooms where the gases were was distinctly bactericidal, yet quite satisfactory for breathing.

The Medical Research Committee have taken the matter up, and provided Dr. Gregor with assistance. It is evident that, if gas could be admitted to the atmosphere of workrooms during epidemics of influenza or other infectious conditions of the nose, throat, and bronchial tubes, and if thereby the spread of these diseases was checked, an important advance in preventive medicine would have been made.

REPORT OF THE ROAD BOARD.

There was published a few days ago the ninth annual report of the Road Board, of which Brigadier-General Sir Henry P. Maybury, K.C.M.G., C.B., M.Inst.C.E., is now Secretary, as well as Manager and Engineer.

The report deals with the twelve months' operations ended March last; and it is stated that during this period applications were made for £218,831, of which £214,841, or 98·18 p.ct., was for "improvement of road crusts." Towards the end of 1918, communications took place between the Board and the Demobilization Committee of the War Cabinet, with the result that the Government decided to make a special grant, the amount of which has been finally settled with the Treasury at £8,000,000, additional to an amount of £2,000,000 provided out of the Road Improvement Fund, making together £10,000,000; and the Board were instructed to administer this fund by making grants for road and bridge work in the ensuing year to highway authorities. The aggregate amount of the grants arranged for up to May 31 last was £7,613,469.

There is embodied a report on the dock and riverside road proposals of the London Arterial Roads Conferences. The conclusion arrived at is that, in view of the greatly increased part which road haulage is serving, and will continue to serve, in commercial transport, the provision of facilities for rapid communication by road, both within the area and between the area and the outside, is of vital importance to the future of Greater London as a port and an industrial and manufacturing centre; and that the schemes proposed by the conferences are by no means sufficient to provide these facilities. They are inadequate for the requirements of internal communication; and they make no provision at all for external connections. The area affected is administratively under the jurisdiction of many different authorities; and no authority exists with powers to lay down a general scheme of development, and with resources sufficient for the financial necessities of the case. Therefore no useful purpose would be served by the Board undertaking either a detailed engineering survey of the particular schemes proposed by the conferences or the preparation of plans and estimates of the more comprehensive schemes that are really required, until adequate powers and resources have been given to some authority so as to secure the co-ordinated development of the entire area, and to scheme the traffic facilities required therefor. The whole matter is one for the Government.

THE HABER PROCESS.

The Alby United Carbide Factories, Ltd., and the Nitrogen Products and Carbide Company, Ltd., have decided to join forces. At the meeting of the latter Company last Wednesday, the Chairman (Major C. H. Campbell) made it clear that he does not think much of the Haber process. He remarked that in the past few months much had been written in the Press as to the merits of the Haber process for the fixation of atmospheric nitrogen in the form of ammonia; but it was evident that a great deal of misunderstanding existed as to the possibilities of the process as compared with the cyanamide method. It was common knowledge that the Haber process was extensively employed in Germany during the war, but according to reliable information, its use was not likely to extend far beyond the district in which it had been developed. Although extremely ingenious, it involved a vast number of operations and intricate processes, besides the employment of very expensive and complicated plant and technical skill of the highest order. According to a recent statement published in the Press, the Germans admitted that successful operation depended upon the special skill which they alone had acquired. The intricate nature of the process was perhaps better illustrated by their own words when agreeing to the French Commission visiting the works of Badische Aniline: "If they, the French, saw the works, they would not be able to duplicate them; and, even when erected, they could not operate them." Moreover, it was a process which was entirely dependent upon coal, and, as such, came directly under the influence of the high prices now ruling.

CURRENT SALES OF GAS PRODUCTS.

LONDON, *Nov.* 17.

The London Market for Tar, Tar Products, and Sulphate.

In the London market pitch continues in a firm position; the price being well maintained at over 80s. per ton net at makers' works. Creosote and other tar oils are in a very strong position; large quantities being required for export for fuel purposes. Ordinary London creosote is firm at 6½d. per gallon net in bulk at works. Tar spirits are in good demand; the values being as follows: Pure benzol and pure toluol, 2s. 9d. per gallon; solvent naphtha (95/160) 2s. 7d. per gallon; 48/50 p.ct. anthracene, 9d. per unit, casks free.

In sulphate of ammonia there is nothing new to report; the price for the current month being £20 15s. per ton to farmers, with a discount of 10s. per ton to dealers, basis 24½ p.ct., with an increase of 4s. per ton for each ¼ p.ct. of ammonia.

Tar Products in the Provinces.

Nov. 17.

The average values for gas-works products during the week were: Gas-works coal tar, 39s. 6d. to 44s. 6d. Pitch, East Coast, 70s. to 72s. 6d. per ton f.a.s.; West Coast—Manchester, 62s. 6d. to 65s.; Liverpool, 62s. 6d. to 65s.; Clyde, 72s. 6d. to 75s. nominal. Benzol 90 p.ct., North, 1s. 8d. to 1s. 10d.; crude 65 p.ct. at 120° C., 1s. 0½d. to 1s. 1½d. naked at makers' works; 50-90 p.ct. naked, North, 1s. 8d. to 1s. 10d. Toluol, naked, North, 2s. to 2s. 1d. nominal. Coal tar crude naphtha in bulk, North, 8d. to 8½d. Solvent naphtha, naked, North, 2s. 3d. to 2s. 4d. Heavy naphtha, North, 2s. 2d. to 2s. 3d. Creosote, in bulk, North, liquid, 5½d. to 5¾d.; salty, 4¾d. to 5d. Heavy oils, in bulk, North, 6d. to 6½d. Carbolic acid, 60 p.ct., 1s. 6d. to 1s. 6½d. Naphthalene, £15 to £17 10s.; salts, £4 10s. to £6, bags included. Anthracene, "A" quality, 7½d. to 8d. per minimum 40 p.ct.; "B" quality, nominal.

FROM A MARKET CORRESPONDENT.

Tar Products.

Markets have developed strength all round, and prices are once more moving upward. There is a heavy export demand for pitch, especially from France and Spain. South Wales briquette makers seem anxious to take all they can get—price being a secondary consideration—in order that they can supply their orders for patent fuel, which, apparently, has not been checked by reason of its high price in foreign countries. Higher prices are looked for. Creosote is very firm, and makers are able to ask higher figures for forward deliveries. Naphthas are showing strength, especially solvent; supplies having again become restricted in Provincial centres. Naphthalenes have improved, the crude in particular; there having been more inquiries of late for the fire-lighter trade. Buyers seem able easily to fill their requirements, and makers still complain that present rates for low-grade crudes are not profitable. Cresylic acid is steady; but trade in carbolic acid is impossible. Benzol continues to move off freely; the efforts being made by the Association to popularize its use evidently meeting with fair success. I understand that the test recently carried out has been in every respect satisfactory. The results are to be published this week.

The range of quotations is as follows:

Benzol: 90% London 2s. to 2s. 2d., North 1s. 11d. to 2s.; 50-90% 1s. 9d. to 2s. London, 1s. 10½d. North; crude, 60-65% 1s. 5d. to 1s. 7d.; pure, 3s. per gallon naked.

Carbolic Acid: Crude 60's 1s. 6d. per gallon nominal; crystals, 40%, 7½d. per lb.

Crude Tar: London, 50s. to 55s.; Midlands, 50s.; North, 50s. per ton *ex* works. Refined tar, 32s. 6d. per barrel.

Pitch: London, 80s. to 85s. per ton; East Coast, 72s. 6d. to 77s. 6d. per ton; West Coast, 70s. to 72s. 6d., with Manchester 70s. per ton and Glasgow 72s. per ton; South Wales, 70s. to 75s. per ton.

Solvent Naphtha: London, 2s. 8d. Provinces average 2s. 9d. per gallon.

Crude Naphtha: Naked, 9d. per gallon.

Heavy Naphtha: 2s. 5d. per gallon.

Naphthalene: Refined, £17 to £19 per ton nominal; crude, £6 5s. to £11, according to quality.

Toluol: Naked, 2s. 6d. per gallon nominal. North, 2s. 5d. Pure, 3s.

Creosote: London, 7¼d.; North, 5¾d. to 6¼d.; heavy oil, 6d. per gallon in bulk.

Anthracene: 40-45%, 7d. to 7½d. per unit per cwt.

Grease Oils: 18° Tw. (naked), £6 10s. per ton f.o.r. makers' works.

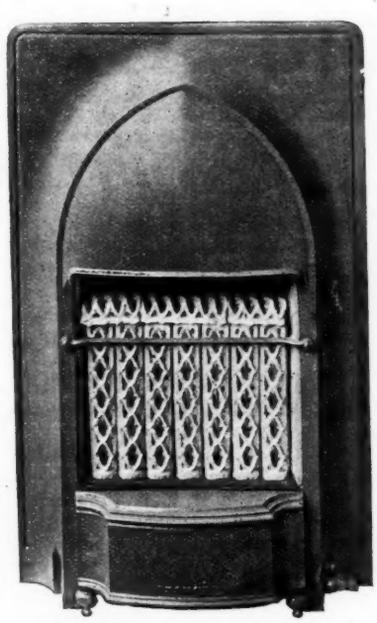
Aniline Oil: 1s. 3d. per lb.

Cresylic Acid: 95%, 2s. 5d. to 2s. 6d.; 97-99%, 2s. 7d. to 2s. 8d. *ex* works London, f.o.b. other ports.

Sulphate of Ammonia.

Sales of this material are improving, which is probably due to the fact that controlled prices will be dearer later on. There is practically nothing available for export. It is stated that negotiations are proceeding for the sale of the Government's synthetic ammonia installation at Billingham-on-Tees to a group of firms who propose to operate the plant, when finished, for the production of sulphate of ammonia. I hope to supply further details in next issue. From America comes the news that supplies there are rather scarce.

A Surcharge at Spalding.—The District Auditor, in a report to the Spalding Urban District Council, calls attention to the unsatisfactory state of the gas undertaking, the expenditure having exceeded the revenue by £4400 during the year, and there being a total deficit of £6450. He surcharges two sums amounting to £123 for bank interest on unauthorized overdrafts, and makes two surcharges in respect of expenditure on the manager's house. He suggests that the Council should seriously consider the charges made for gas.



NEW "MAIN" FIRES.

THE new "Gothic" Gas Fires are now ready—also many other new designs. Every "Main" Fire will give daily dividends of comfort to your consumers. Don't allow the old type wasteful Gas Fires to continue in use. Replace them with "Mains," so making the most of your output and adding satisfied customers to your list for the good times ahead.

What quantity of New "Main" Lists may we send you?

R. & A. MAIN, LTD.

WORKS: Gothic Works, EDMONTON, N.18; Gothic Ironworks, FALKIRK; and Gothic Works, BIRMINGHAM.
SHOW-ROOMS AND BRANCHES: 25, Princes Street, Oxford Circus, W. 1; 82, Gordon Street, GLASGOW; 18, Severn Street, Deansgate, MANCHESTER; 6, Narrow Wine Street, BRISTOL; 97, Millfield, BELFAST; 333, Queen Street, MELBOURNE.

Peace Commemoration at Hebden Bridge.

To commemorate the declaration of peace, the Chairman of the Hebden Bridge and Mytholmroyd Gas Board (Mr. C. Robertshaw, J.P.) and the Clerk (Mr. R. Crabtree) last Tuesday night presented to the Board framed copies of their photographs, to be hung in the Board Room. The event also coincided with the completion of 25 years' experience in the manufacture of gas; and, in honour of the dual event, the Chairman and Clerk were the chief guests at a function organized by the Board. Mr. Robertshaw has been a member of the Board for fourteen years; and Mr. Crabtree has been Clerk since the works were purchased from the old local Gas Company. The most interesting speech of the evening was given by Mr. Crabtree, who reviewed the development of the works. He said that, in accordance with an Act passed in 1895, the works were purchased by the two local Councils for £67,950; the area of the district then being 21,786 acres, and the population 13,998. Mr. E. T. Crossley was appointed first Chairman, and since then there have only been three others in the chair. Enlargements at the works became necessary, and land was purchased for the purpose. Redeemable stock at 3 p.ct. was issued to the value of £76,000; and loans were negotiated for £24,800—making a total of £100,800. Up to the end of last March, the total cost of the works was £120,676; and there were still outstanding stock and loans to the value of £57,576. The output of the works, during the 25 years, has increased from 44 to 102 million c.ft.; and the price of gas has gone up from 2s. 3d. to 5s. 3d. per 1000 c.ft. Owing to the erection of up-to-date vertical retorts on the "Dempster-Toogood" system, the Manager (Mr. T. H. Nield), in his last annual report, was able to record a decrease of 1133 tons of coal carbonized. Mr. Robertshaw stated that the works had been extended to meet the needs of the district, and the installation of vertical retorts had worked well. When he joined the Board, the amount of gas made per annum was 80,500,000 c.ft., and 7583 tons of coal were used. Last year the Board manufactured 102,000,000 c.ft. of gas from 6880 tons of coal.

Leeds Intermittent Vertical Retorts for Aylesbury.—Messrs. Goodall, Clayton, & Co., Ltd., have secured a contract from the Aylesbury Gas Company for a retort-bench comprising three beds of eight retorts each, on the Leeds intermittent vertical retort system, adapted for the use of Settle's down-steaming process, together with the coal and coke handling plants.

Accrington Gas Supply.—Mr. A. J. Harrison, the General Manager of the Accrington and District Gas Board, lays the blame for "bad gas" on the quality of coal. He said they had received 700 tons of very inferior coal from Durham, costing the Board nearly £200 more than the average paid for Yorkshire coal. Five years' war conditions and serious neglect of the plant could not be remedied in a few minutes. Coupled with bad conditions, there had been a 12 p.ct. increase in consumption, which, with the obsolete plant and bad distributing system, had made things additionally difficult.

Oriental Gas Company, Ltd.—The Directors state in their report which will be submitted at to-morrow's meeting that the revenue account shows a satisfactory result of the working for the twelve months ended June 30. The gas-rental is higher by £884 than that of the preceding year; while, on the other hand, the cost of coals, purification, and wages is less by £1946. The amount yielded by the sale of residual products, though not equal to the corresponding return for the year 1918 (the market prices during which period were abnormally high), is fully up to expectations. The item of exchange (£5579) represents the profit upon the Company's remittances from Calcutta to London, and is due to the extraordinary rise in the value of silver, which raised the exchange value of the rupee from 1s. 4d. to 1s. 8d. on June 30, and ultimately to a figure slightly in excess of 2s. In result, the balance of revenue account carried to the credit of profit and loss, after allocating £10,000 to the renewals' suspense account, is £26,192. The after-effects of the war continue in a high degree to affect trade and commerce detrimentally; and the Directors have not been able to obtain the requisite material to enable them to carry out all the operations they designed. But the position now promises to become easier. The expenditure upon all operations, whether properly assignable to capital or not, has been defrayed out of the revenue of the year.

Hull Public Lighting Charge.—Amended terms for public lighting have been accepted by the Hull Corporation. Mr. Harold E. Copp (the Engineer and Manager at Hull of the British Gas Light Company) has had an interview with the Corporation Works Committee. As to the points raised at the meeting, there was first the adjustment of the contract price to provide for the increased cost of coal. Mr. Copp stated in a subsequent letter that it is proposed that 1s. 6d. per lamp per annum be added for each 1s. per ton increase. As each lamp burns 18,000 c.ft. per annum, and assuming a yield of 12,000 c.ft. of gas per ton of coal, this, he stated, exactly amounts to 1s. 6d. per lamp per annum. This, however, does not provide for the enormous increases in the cost of coal which are being imposed upon them through the action of the Coal Controller, who has of late been sending them supplies of coal from Northumberland and Durham, the carriage on which has, in some cases, amounted to almost as much as the cost of the coal. Secondly, with regard to the proposed adjustment to provide for advances in wages, it was pointed out by the Committee that, on the assumption that each man lighted 100 lamps, the Company should only ask 1s. per lamp per annum for each 1s. per week advance in wages; but at present the average number of lamps lighted per man is not 100, but 69. In order to meet the Corporation on the point, he was willing to concede that, if more than 2500 lamps are in lighting, 1s. only per lamp per annum shall be added to the contract price for every 1s. per week advance in the wages of lamplighters. At the same time he pointed out that there are the wages of repairs and maintenance to be taken into consideration. This quotation was accepted. The offer of the Corporation of £6000 in settlement of the Company's account of £6484 6s. 10d. for the half year ended June 30th has been accepted by the Directors of the Company.

USE Simmance's

DEAD BEAT INDICATORS

instead of WATER-TUBE GAUGES and

"READ THE PRESSURE BY THE POINTER."

No liquid to evaporate and no levels to adjust.

No glasses to break and nothing to clean.

Direct reading, Open scale, Any range (Pressure, Vacuum, or Combination).

Incorrodible, Accurate, for foul or purified gas.

MADE IN MANY RANGES WITH TABLETS LETTERED AS DESIRED.

ALEXANDER WRIGHT & CO., LTD., WESTMINSTER.

Agents: Australia—FYVIE & STEWART, 360, Collins St., Melbourne; Canada—W. P. ROPER, 502, Merchants' Bank Building, Montreal.

There were last year in the United States 180 firms, employing 26,217 persons of all grades, engaged in the production of coal-tar derivatives.

Mr. W. Doig Gibb, who has been engaged to investigate the working of the Burnley gas undertaking, has made a thorough inspection of the plant, the method of working, and the general administration.

Lamplighters and other employees of the Paris Gas Company have presented demands for an increase of wages; the requests being accompanied by threats to strike if the advance is not conceded.

Mr. J. Parkington complained at a Darwen meeting last week that in twelve years the Council had devoted over £17,800 profits made at the gas-works to ease the rates, instead of reducing either the price of gas or the capital charges.

After for several years allowing the Press access to the Gas and Electricity Committee's meetings, the Middlesbrough Corporation decided last week that they should not be admitted in future, "owing to the important negotiations and discussions which take place from time to time."

The gas workers at Burnley having made another application for an advance of wages, it was stated they had intimated, on Friday, that if they were conceded the wages increase of 5s. a week recently given to the engineering and sundry trades, and the same conditions, the Union would recommend acceptance. Should agreement not result, they will press for arbitration.

Two cases of self-poisoning by gas were reported at Leeds last Tuesday. One was that of a woman named Eliza Cooper (aged 65), who had pulled the plug out of the gas-pipe in her bedroom, and sat with her face near the open end. She died at the infirmary. The other was that of James Flowett, who turned on the gas in his room after attaching a tube to the bracket. He was found quite dead, with the tube hanging close by his face. In each case a verdict of "Suicide while of unsound mind" was returned.

Arrangements have been made for the amalgamation of the business carried on by Mr. Robert W. Paul at New Southgate, with the Cambridge Scientific Instrument Company, Ltd. Mr. Paul will join the Board; and the manufacture of instruments will be continued both at Cambridge and at New Southgate. On Jan. 1 next, the name of the Company will be altered to the Cambridge and Paul Instrument Company, Ltd., and as soon as possible the head office and showrooms will be transferred to London.

A second fatality within a few days from gas poisoning at Nottingham, occasioned through defective fittings, was investigated by the City Coroner last Friday week; the victim being Mary Hatfield, aged 79. In consequence of the deceased not being seen, forcible entrance was effected at the house by a policeman, who discovered her lying on the bedroom floor dead. The room was full of gas; and upon turning it off at the bracket, he found that the tap was very loose. A verdict of "Death from misadventure" was returned.

APPLICATIONS FOR PATENTS.

[Extracted from the "Official List" for Nov. 12.]

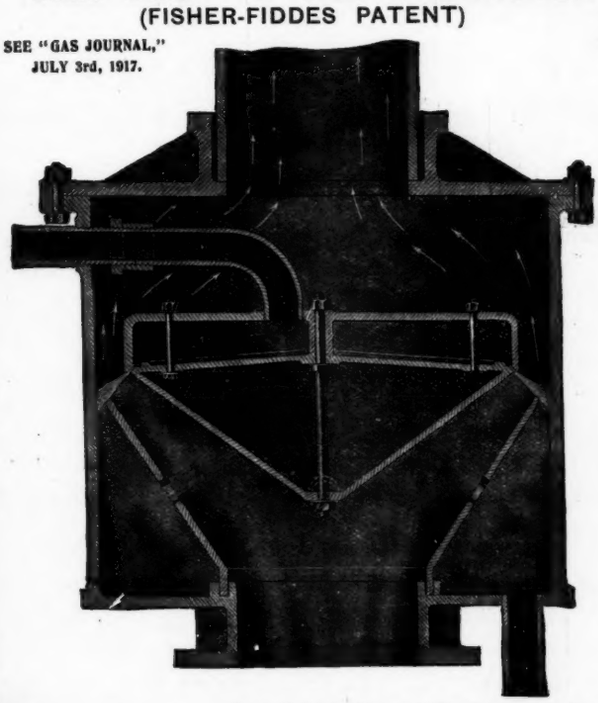
Nos. 26,918—27,695.

AIRD, K.—"Gas-regulator." No. 27,514.
BALE, G. F.—"Apparatus for carbonization of coal, lignite, shale, &c." No. 27,090.
BROWNLEE, R. H.—"Combustible gaseous compositions for cutting, welding, &c." No. 27,290.
CHALMERS, R. B.—See Aird. No. 27,514.
CHEFFINS, H. W. J.—"Gas-saving appliances." No. 27,333.
DARBY, A. C. & P. L.—"Fastening-device for positioning pipes, &c." No. 27,217.
DAVIS, A. H.—See Cheffins. No. 27,333.
DAVIS-BOURNONVILLE CO.—"Gas cutting-machine." Nos. 27,163, 27,165.
FAIRBROTHER, H.—"Device for igniting gas-jets." No. 27,409.
FISCHER, M.—See Fairbrother. No. 27,409.
FORESTER, C. J.—"Bunsen burners, &c." No. 27,328.
GLOVER, W. R.—"Coin-freed gas-meters." No. 27,541.
HIGGINS, A. R.—"Combined gas lighting and boiling burner." No. 27,127.
KNOX, W. F.—"Gas-stoves." No. 27,176.
LESSING, R.—"Removal of dust from blast-furnace gases." No. 27,257.
LEVIN, H.—See Knox. No. 27,176.
MITCHELL, J.—"Mechanically-operated coke extracting-apparatus for inclined and vertical carbonizing retorts, &c." No. 27,213.
PEMBER, A. H. & H.—"Atmospheric gas-burners." Nos. 27,047, 27,048.
PERCIVAL, S.—See Davis-Bournonville. No. 27,165.
PITCHFORD, W. E.—"Melting-furnaces and burners." No. 27,613.
RICARDO, H. R.—"Gas-mixing valves for internal combustion engines." No. 27,571.
SIMPSON, W. M.—"Incandescent gas-burners." No. 27,292.
SPEARS, F. G. W.—"Gas-mantle holders." No. 27,098.
STEAD, E. J.—"Valves and cocks." No. 27,380.
STROUD, E.—"Lighting fittings." No. 26,995.
THOMPSTONE, F. W.—"Bunsen gas-burner for dental, &c., purposes." No. 27,632.
UHLINGER, R. H.—See Brownlee. No. 27,290.
WARD, E. A.—"Mixing-devices for atmospheric gas-burners." No. 27,204.
WRIGHT, F. L.—"Gas-fittings." No. 27,542.

Messrs. A. & W. Richards, of No. 37, Walbrook, E.C., will sell by auction, at the Cannon Street Hotel, next Tuesday, by order of the Directors, £10,000 of 6 p.ct. irredeemable preference stock of the Colchester Gas Company. Two o'clock is the time of the sale.

"TAR FOG" & TAR EXTRACTOR
(FISHER-FIDDES PATENT)

SEE "GAS JOURNAL," JULY 3rd, 1917.



FOR THE ELIMINATION OF TAR & TAR FOG FROM COAL GAS AND OIL VAPOURS FROM C.W. GAS

WHY NOT TRY THE

NEW METHOD

AUTOMATIC EFFECTIVE & INEXPENSIVE

PARTICULARS AND PRICES FROM

R. & J. DEMPSTER, LTD., MANCHESTER.

Temporary London Office: BLENHEIM MANSIONS, BROADWAY, WESTMINSTER, S.W. 1.
London Office Telephone No. Vic. 7426.

STOCK MARKET REPORT.

THE Stock Exchange has not had an entirely agreeable week; some chilling factors operating to induce dulness and, at times, even some degree of depression. The tightness of money and the chance of a higher Bank rate was one, the crisis in Wall Street was another, and the imminence of another National Loan made a third. Thus almost all round prices sagged; and at the close they did not show much disposition to rally, and caution was the watchword.

The gilt-edged market was weak generally, and Home Government issues gave way. Consols were unchanged at 50⅜-51⅜ on Friday; but War Loan marked 90¾-91¼, Funding 74¼-75, and Victory 79⅝-80½. Bonds were also down. Home Rails were little dealt in, and then at lower figures. Canadians were irregular and Argentines easy.

The Foreign Market was depressed by persistent Continental selling. French Loans had a further fall owing to the Exchange; but they seemed inclined to steady towards the close.

Weakness was the feature in the Miscellaneous Market; Rubbers were being sold, and Oils had some sharp setting back. Most of the favourite lines appeared to be similarly affected.

Business in the Gas Market was a good bit quieter than in the preceding week—the times not being propitious for active dealing. But there was no sign of any weakening. On the contrary, a number of issues commanded higher prices. The London Gas Companies were rather conspicuous in this respect. Gas Light ordinary rose 2, South Metropolitan 1, Commercial 4 p.ct. 1, and ditto 3½ p.ct. 2. Brentford and British also advanced. Imperial Continental Gas Association was steady and unchanged at the previous week's figures, and Primitiva ordinary was just a fraction higher.

Bargains done for cash during the week were as follows: On Monday, Cape Town 7 1/16, ditto preference 6¾, Commercial 4 p.ct. 57, 58, Gas Light ordinary 61½, 62¾, ditto maximum 45½, ditto preference 66¾, 67¼, Imperial Continental 133, 134, 134½, 136, Monte Video 80, 81, Primitiva 36s. 3d., ditto preference 67s. 6d., ditto debenture 72, 72¼, South Metropolitan debenture 53. On Tuesday, Brentford "A" 56, Cape Town, 7, 7 1/16, 7 1/16, 7⅛, Commercial 3½ p.ct. 53½, 54, Gas Light ordinary 62, Monte Video 80½, Primitiva, 36s., 37s., 38s. 9d., ditto preference 67s. 6d., South Metropolitan 61, 62. On Wednesday, Bombay 5⅜, Brentford "B" 53½, 55½, British 25⅛, 25½, European 12⅛, Gas Light ordinary 62½, 63, 63⅜, Hong Kong, 9, 9½, Imperial Continental 134, 134½, Primitiva 36s., 36s. 3d., ditto preference 65. On Thursday, British 25½, Commercial 4 p.ct. 58, ditto 3½ p.ct. 54, Gas Light ordinary 62½, 62⅜, 63, 63¼, 63½, 64, ditto preference 66½, ditto debenture 52½, Imperial Continental 134, 135, 135⅜, 136, Croydon 5 p.ct. "D" 70, Milwaukee First 4 p.ct. Bonds 104. On Friday, Brentford "A" 58, Gas Light ordinary 63, 64, ditto preference 66⅜, 67¼, ditto debenture 52, Imperial Continental 134, 134½, 135, 135½, 135⅜, 136, Primitiva preference 67s. 6d., South Metropolitan 61, South Suburban 70.

In the Money Market, rates fluctuated almost from day to day, but never went to extremes in either direction. Discount was harder and steadier. On Wednesday, silver reached another record price, 69d.

The Bank rate is 6 p.ct., as fixed on the 6th inst.

ANTE-WAR PRICES AND DIVIDENDS, LATEST DIVIDENDS, AND LAST WEEK'S BARGAINS.

Issue. £	Shares	When Dividend.	Ante-War Dividend & Bonus p.c.	Last Dividend.	NAME.	Closing Prices, July 30, 1914.	Present Prices.	Lowest and Highest Prices of Bargains.
182,049	Stk.	July 31	4	4%	Aldershot 4 p.c. Pref.	..	60—65	..
1,551,868	"	Sept. 26	2½	2½%	Alliance & Dublin Ord.	39—44	43—48	..
874,000	"	July 11	4	4%	Do. 4 p.c. Deb.	75—79	60—69	..
280,000	5	Oct. 30	7½	8%	Bombay, Ltd.	5⅞—6⅛	5⅞—5⅞	5⅞
50,000	10	Aug. 28	15	12½	Bournemouth Gas and Water { 10 p.c.	20—30	19—20	..
882,110	10	"	7	7%	B 7 p.c.	15—15½	10—11	..
115,800	10	"	6	6%	Pref. 6 p.c.	13½—14	9½—9¾	..
159,740	—	June 27	—	4%	4 p.c. Deb.	..	85—87	..
992,045	Stk.	July 11	14	87/-	Brentford A Consolid.	261—266	56—61	56—53
734,920	"	"	11	31/8	Do. B New	204—209	52—57	53½—55½
55,000	"	"	5	5%	Do. 5 p.c. Pref.	102—111	76—79	..
221,480	"	June 11	4	4%	Do. 4 p.c. Deb.	91—98	84—66	..
214,775	"	Sept. 11	11	7½%	Brighton & Hove Orig.	208—213	123—128	..
244,300	"	"	8	6½%	Do. A Ord. Stk.	154—159	84—89	..
988,500	Stk.	—	5	5%	Bristol 5 p.c. max.	..	..	..
580,000	20	Sept. 26	12½	10%	British	44—45	25—27	25⅜—25½
120,000	Stk.	June 27	4	4%	Do. 4 p.c. Deb. Stk.	88—90	63—65	..
245,771	"	"	4	4%	Buenos Aires 4 p.c. Deb.	85—87	50—58	..
100,000	10	—	—	—	CapeTown & Dis., Ltd.	1½—2½	6⅞—7½	7—7⅛
100,000	10	Oct. 30	—	4½%	Do. 4½ p.c. Pref.	4—6	6½—7	6⅞
100,000	Stk.	June 27	4½	4½%	Do. 4½ p.c. Deb. Stk.	70—75	61—66	..
157,150	"	Feb. 26	5	5%	Chester 5 p.c. Ord.	108—110	..	..
1,518,980	"	Aug. 14	5/9/4	80/-	Commercial 4 p.c. Stk.	106—108	56—61	57—58
580,000	"	"	5½	26/8	Do. 3½ p.c. do.	108—105	62—57	63½—64
475,000	"	June 11	8	8%	Do. 5 p.c. Deb. Stk.	69½—71½	60—62	..
800,000	"	"	4	—	Continental Union Ltd.	75—79	35—40	..
200,000	"	"	7	—	Do. 7 p.c. Pref.	115—118	60—65	..
51,600	Stk.	Aug. 28	14½	12%	Croydon A 10 p.c.	..	135—145	..
278,408	—	"	11½	9%	Croydon B and C 7 p.c.	..	95—105	..
493,710	Stk.	—	6	6½%	Derby Con. Stk.	128—125	..	..
55,000	"	—	4	4%	Do. Deb. Stk.	102—104	..	..
1,002,180	10	July 30	10	5/0	European, Ltd.	17½—18	12—18	12½
16,398,975	Stk.	"	4/17/4	80/-	Gas { 4 p.c. Ord.	98—102	62—65	61½—64
2,600,000	"	"	8½	26/8	3½ p.c. max.	76—79	45—47	45½
4,062,385	"	"	4	4%	Light { 4 p.c. Con. Pref.	96—99	65—68	66½—67½
4,074,850	"	June 11	8	8%	and { 3 p.c. Con. Deb.	72½—74½	52—55	53—53½
180,000	"	"	10	10%	Coke 10 p.c. Bonds	..	..	..
82,500	"	Sept. 11	5	4½%	Hastings & St. L. 5 p.c.	..	57—62	..
358,740	"	"	8½	2½%	Do. 3½ p.c	37—39	40—45	..
70,000	10	April 29	11	7%	Hongkong & China, Ltd.	15½—16½	8½—9½	9—9⅛
66,600	Stk.	Aug. 28	9	8½%	Hornsey 7 p.c.	..	90—95	..
181,000	"	Sept. 11	7½	5½%	Ilford A and C.	151—154	88—92	..
65,780	"	"	6½	4½%	Do. B	115—118	67—72	..
65,500	"	June 27	4	4%	Do. 4 p.c. Deb.	92—94	61—64	..
6,949,000	"	May 14	9	4½%	Imperial Continental	150—160	133—138	133—136
1,985,000	"	Aug. 14	8½	8½%	Do. 8½ p.c. Deb. Red.	84—86	81—84	..
985,942	"	Sept. 11	6½	6½%	Lea Bridge Ord. 5 p.c.	119—121	87—92	..
2,498,995	"	Feb. 26	10	42/6	Liverpool 5 p.c. Ord. { A	211—213	..	..
						146—148		
906,088	"	June 26	4	4%	Do. 4 p.c. Pr. Deb. Stk.	..	..	..
155,736	"	Aug. 14	7/5/8	83⅜%	Maidstone 5 p.c.	..	56—61	..
75,000	5	June 11	6	8%	Malta & Mediterranean	4½—4¾	1½—2½	..
250,000	100	Oct. 1	4½	4½%	Met. of Melbourne } 4½ p.c. Deb.	99—101	90—97	..
841,930	Stk.	May 29	4	—	Monte Video, Ltd.	11½—12	77—82	80—81
1,575,592	"	July 30	4½	3½%	Newcastle&Gatsh'd Con.	98½—99½	68—65	..
629,705	"	June 27	8½	8½%	Do. 3½ p.c. Deb.	86—88	57—58	..
15,000	10	Sept. 11	—	11%	North Middlesex 10 p.c.	..	132—132	..
55,940	10	"	7/14/0	7%	" " 7 p.c.	14—16	9—9½	..
800,000	Stk.	May 14	8	8%	Oriental, Ltd.	117—122	104—107	..
60,000	5	Mar. 26	10	1/-	Ottoman, Ltd.	7½—7¾	4⅜—5½	..
60,000	50	Aug. 28	18	7½%	Portsea, Island B	125—131	74—76	..
100,000	50	"	12	6½%	Do. C	118—121	56—58	..
949,980	5	April 29	8	—	Primitiva Ord.	5⅜—6	12—2½	36/—38/9
499,960	5	June 26	5	—	Do. 5 p.c. Pref.	4⅜—5	3½—3⅝	65/—67/6
521,600	100	June 2	4	4%	Do. 4 p.c. Deb.	91—98	71—73	73—72½
600,000	Stk.	July 30	4	4%	Do. " " 1911	..	49—52	..
846,198	"	June 27	4	4%	River Plate 4 p.c. Deb.	85—87	49—52	..
150,000	10	Sept. 26	6	6/-	San Paulo { 5 p.c. Pref.	10½—11	7½—8	..
125,000	50	July 2	5	5%	5 p.c. Deb.	47—49	40—42	..
125,000	Stk.	Aug. 28	10	5%	Sheffield A	228—234	87—92	..
209,984	"	"	10	5%	Do. B	228—234	87—92	..
238,500	"	"	10	4½%	Do. C	230—232	80—85	..
133,201	Stk.	Sept. 12	4	4%	Shrewsbury 5 p.c.	..	..	..
90,000	10	Oct. 15	9	10%	South African.	10½—11½	12—13	..
6,609,895	Stk.	Aug. 14	5/4/0	80/-	South Met. 4 p.c. Ord.	111—118	60—63	61—62
250,000	"	July 11	—	5%	Do. Pref.	..	94—96	..
1,896,445	"	"	8	8%	Do. 3 p.c. Deb.	72½—74½	51—54	53
224,220	"	Aug. 14	8½	8%	South Shields Con. Stk.	157—159	104—106	..
962,795	"	"	6	8½%	S'th Suburb'n Ord. 5 p.c.	114—116	68—73	70
187,558	Stk.	June 27	8	8%	Do. 5 p.c. Deb. Stk.	116—118	85—88	..
647,140	"	Nov. 13	7½	8½%	Southampton Ord.	99—102	62—64*	..
121,275	"	June 27	4	4%	Do. 4 p.c. Deb. Stk.	..	63—65	..
130,000	"	Aug. 14	—	4½%	Tottenham { A 5 p.c.	135—138	70—76	..
762,275	"	"	6	8%	District { B 3½ p.c.	115—117	50—55	..
181,365	"	June 26	4	4%	4 p.c. Deb.	87—89	64—66	..
182,880	10	Dec. 30	5	—	Tuscan, Ltd.	5—6	1—2	..
149,900	10	July 1	5	5%	Do. 5 p.c. Deb. Red.	93—95	45—50	..
936,476	Stk.	Sept. 26	5	5½%	Tynemouth 5 p.c. max.	108½—109	74—76	..
					Wandsworth, Wimbledon, and Epsom—			
80,000	"	Aug. 28	8½	55/-	Wandsworth A 5 p.c.	131—136	85—90	..
255,686	"	"	6¾	40/-	Do. B 3½ p.c.	129—134	63—68	..
108,075	"	"	—	38/6	Do. C	..	63—68	..
140,865	"	"	—	38/6	New Ordinary	..	63—68	..
893,000	"	"	6½	38/9	Wimbledon 5 p.c.	117—123	65—70	..
98,000	"	"	6¾	40/-	Epsom 5 p.c.	121—126	65—70	..
88,416	"	June 27	8	8%	3 p.c. Deb. Stk.	56—59	49—51	

* Ex Div.

NOTICES TO CORRESPONDENTS, ADVERTISERS, AND SUBSCRIBERS.

No notice can be taken of anonymous communications. Whatever is intended for insertion in the "JOURNAL" must be authenticated by the name and address of the writer—not necessarily for publication, but as a proof of good faith.

COPY FOR ADVERTISEMENTS for the "JOURNAL" should be received at the Office NOT LATER than TWELVE O'CLOCK NOON ON MONDAY, to ensure insertion in the following day's issue.

Orders to Alter or stop PERMANENT ADVERTISEMENTS should be received by the FIRST POST on Saturday.

Wanted, For Sale, and Tender Advertisements, Six Lines and under (about 36 words) 3s.; each additional Line, 6d.

TERMS OF SUBSCRIPTION to the "JOURNAL."

		ONE YEAR.	HALF-YEAR.	QUARTER.
United Kingdom	Advance Rate:	28/-	15/-	8/8
	Credit Rate:	32/-	16/-	9/6
Abroad (in the Postal Union) Payable in Advance		32/6	17/-	10/-

In payment of subscriptions for "JOURNALS" sent abroad, Post Office Orders or Bankers' Drafts on London only are accepted.

All Communications, Remittances, &c., to be addressed to WALTER KING, 11, BOLT COURT, FLEET STREET, LONDON, E.C. 4.

Telegrams: "GASKING, FLEET LONDON." Telephone: Holborn 6857.

H. MITCHELL, FOR PATENT SLOT METER PAD & OTHER LOCKS. KENTISH TOWN, N.W.